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No. 4.

Pollination in Relation to Set of Fruit

by M. J. Dorsey

West Virginia University



A tent for use in covering trees to make self and cross sterile tests.

THERE are many times during the year when the prospect of a fruit crop is held in the balance. In order to carry out an adequate and well-directed orchard program, the grower should have in mind the time fruit buds are formed, as well as the time of bloom and the time of ripening. The apple, peach, pear, plum, and cherry form fruit buds during the middle and late summer of the season preceding bloom. Development does not proceed quite so far before winter in the grape, strawberry and the brambles, but before growth stops, the rudiments of the clusters can be found in each of the latter. It will be seen then that while one crop is maturing, the plant is making preparation for the next crop. The overlapping of bearing and fruit formation makes it necessary for the grower to direct his operations so as to strike a balance between these functions. Let us consider, in detail, some of the things which prevent a heavy yield of fruit after the production of a full crop of fruit buds as they appear on the tree in the fall, in other words, some of those things which stand between the grower and his profit.

The Influence of Weather on the Set of Fruit

The first thing that takes its toll from the sum total of fruit (the buds which are formed before the winter rest sets in) is winter-killing. Peach and cherry growers especially know the damage to the crop from the killing of the fruit buds in winter. A similar injury sometimes occurs also



One limb only in bloom—an unprofitable crop in sight.

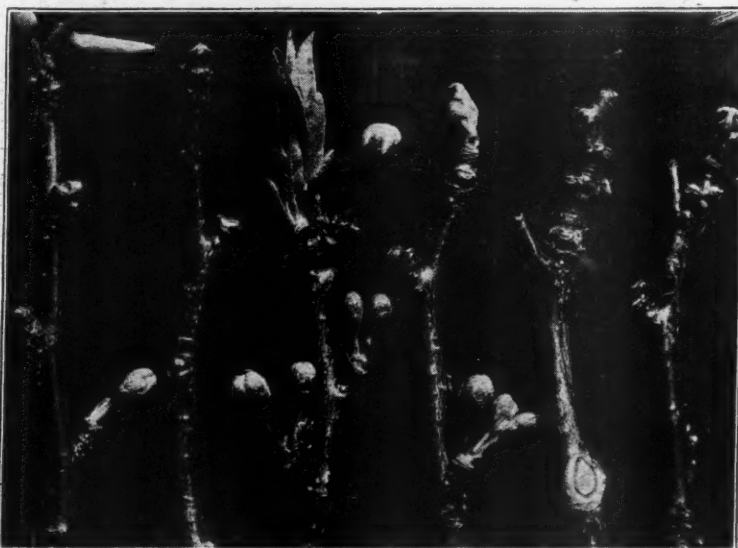
to apples. It is generally recognized, however, that winter injury can eliminate even more than one-half of the fruit buds when the set is heavy without reducing the crop, but when the set of fruit buds is light, such extensive injury thins out too many buds and the prospect of a crop is reduced accordingly. The injury from winter killing, therefore, all too frequently results in a complete loss of the crop.

During some of the severest winters in addition to killing the fruit buds, the tree is also injured more or less severely. The severe winters—"test winters" so-called—with their wide spread injury to fruits in general, occur too often to be disregarded, and these should be kept in mind, not only in selecting the variety list but

growth than during winter dormancy. In a limited way, orchard heating is resorted to in some instances as a means of limiting the damage from frosts and freezes at bloom, yet it may be said that the industry, as a whole, has practically no protection and is dominated by weather during bloom. While coverings with such crops as the strawberry and late blooming varieties may lessen the damage from frosts, yet these cannot always be depended upon. The extent of this domination in any region is well known to growers.

Adverse Weather Conditions Interfere with Set

In the absence of winter killing in the fruit buds and of frosts at bloom,



Fruiting spurs of the plum with occasional flower buds left after winter killing. Note the scars where fruit buds with all of the flower buds killed have dropped off.

also in cultivation, especially of the kind which brings about late fall growth.

With some of the peach, plum and cherry varieties, bearing is dominated by winter killing and to a very large extent many orchards are rendered unprofitable over a series of years from this cause alone. Experienced growers appreciate the importance of hardiness in the fruit buds and do not, therefore, regard heavy fruit bud production as certainly insuring a "bumper" crop.

On the other hand, after an adequate set of fruit buds has survived the winter and the trees are in bloom, still, frosts and freezes often seriously damage the crop because bloom is in many respects the most sensitive stage between fruit bud initiation and the ripe fruit. While there is some difference in the resistance of the different varieties to frost, yet there is much less resistance at this stage of

adverse weather in the form of cold, prolonged rains, or even extremely windy weather during bloom greatly interferes with the set. Every fruit grower is familiar with the fact that a heavy bloom does not always mean a full crop of fruit, even in the absence of winter killing in the fruit buds, or killing of the flowers by frosts when the trees are in bloom. The reason for this will be evident when the nature of the processes which must take place at bloom are understood. These processes may be briefly enumerated as follows: First, pollen must be made available by the dehiscence, or opening of the anthers. When it rains during bloom, those anthers which are open, close and remain closed as long as wet; those anthers which have not yet opened do not do so until after the rain, when sufficient drying can take place to open them. Pollen is not available as long as it rains, even if bees were



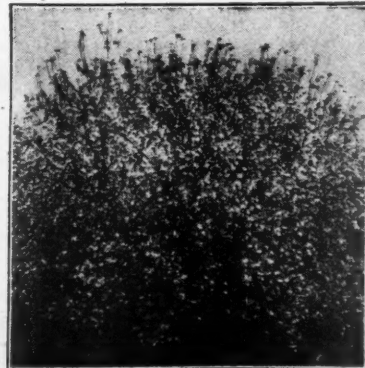
An unfruitful branch of Ancient Britan which apparently was not cross pollinated. Snyder in same patch is setting.

working. If pollen has reached some of the stigmas before the rain, the low temperatures, which so often accompany prolonged storms, slow down the processes of growth generally, and fertilization is in this way delayed somewhat. Spring showers apparently cause no damage as far as the set of fruit is concerned.

Second—If a storm at bloom lasts for a number of days—as is so often the case—it is quite important as far as the set is concerned that the days following are warm and conditions are suitable for bee flight. If these conditions do not prevail, the chances of a set of fruit, even with a full bloom, are greatly lessened, because the stigmas have a limited time, four to six days, during which they remain functional, before turning brown and dying back. After the stigmas die, if pollination has not taken place, the set is prevented in all such flowers, because fertilization is prevented after the die back of the stigmas. There is apparently not so much damage from washing pollen from the stigmas as has generally been supposed, because observations show that pollen adheres to the stigma, even during prolonged rains.

Third—So far, we have dealt only with pollen transfer, from the anther to the stigma, which is accomplished for the most part in fruits by bees but very little by wind. This alone does not insure a heavy set in all cases,

(Continued on page 18)



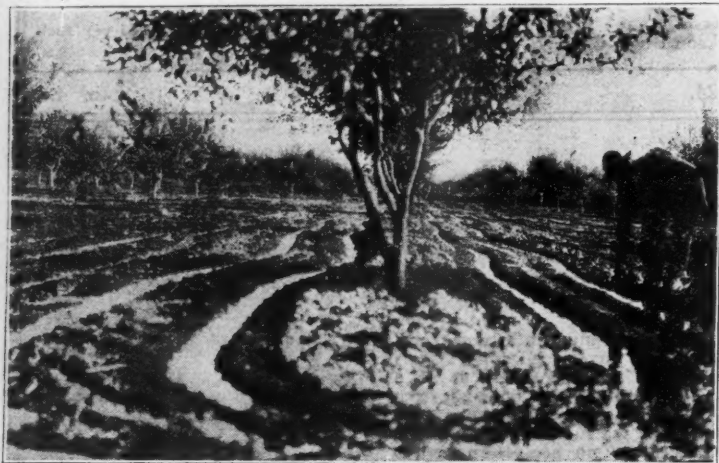
A full bloom with the promise of a crop.

Irrigation Practices in the Northwest

by C. C. Vincent
University of Idaho

THERE is no question but that moisture is one of the important factors in the production of commercial apples in the fruit districts of the Northwest. If the fruit growers had to depend upon natural precipitation for the development of their orchards, very few apples

roots spread, additional furrows should be added from year to year. The third year at least two furrows



Watering all the space between the rows in an orchard seeded for a cover crop.

would be produced, as the annual rainfall ranges from 9 to 20 inches. A few districts which have a rainfall of from 25 to 30 inches must also rely upon irrigation since the largest amount of this moisture falls during the winter months, while the trees are dormant. Intensive irrigation, therefore, is necessary to produce apples in Idaho, Washington, Montana, Utah, and parts of Oregon.

While there are a great many factors which enter into the problem of orchard irrigation, such as age of trees, soil types, systems of orchard management, etc., the methods followed in the various fruit districts of the Northwest are quite similar.

Irrigation of Young Trees.

The common method of applying water to orchards is known as the corrugation method. This system consists in running the water in small parallel ditches or furrows which vary in depth, length and distance apart, according to the character of the soil and age of trees. Corrugations are made with a sled-like implement, having two or more runners or shovels. The lateral movement of the water in the soil should determine the spacing of the furrows. Since the water should subacross in from 12 to 24 hours in medium soils, the furrows should be from two and one-half to three feet apart, while in the more impervious soils, 18 inches to two feet will suffice. In sandy soils, the furrows should be spaced from three to five feet. To prevent excessive evaporation, the furrows should be from six to eight inches in depth. Growers are pretty well agreed that it does not pay to run water in furrows a greater distance than 500 to 600 feet. On porous soils, shorter distances, such as 200 to 300 feet, are advisable.

The number of furrows between the rows, of course, must be varied to suit the age of the orchard and the character of the soil. Enough should be made, however, so that the water is distributed throughout the soil. In watering the newly planted trees, it is a common practice to run the water down a single furrow when the trees have been planted, after which the ditch is plowed under. This insures a thorough soaking of the tree roots. During the growing season the first summer, some growers irrigate the young orchard with one furrow, but this is not enough. After the first irrigation, at the time of planting the young trees, there should be at least two furrows, one on each side of the tree rows. These furrows should be from two and one-half to three feet distant from the tree row. As the



A good dust mulch conserves moisture.

on each side of the tree rows are required.

Quantity of Water Required.

The quantity of water required to stimulate vigorous growth naturally varies with different types of soil and other conditions, but in general, from two to three acre inches per application is ample. The number of applications varies considerably. On the deep retentive soils from two to four are ample, while on the shallow soils six waterings are not uncommon. Most of the growers seem to agree that early applications are necessary in order to secure maximum tree growth.

The irrigation season is from April or May to August or September. On the retentive soils, the practice is to make the first application in May or June and continue until August. On the lighter soils, some of the growers begin in April and continue until September. In any case, the irrigation should cease in the young orchard in plenty of time so that the wood will have plenty of time to mature. If the water is not withheld at this time, killing back may result should a severe freeze occur.

Cultivation and Irrigation Should Go Hand in Hand.

It should be borne in mind that in the development of the young orchard,

or, for that matter, the bearing orchard, cultivation plays an important part. Irrigation and cultivation should go hand in hand. Irrigation cannot take the place of cultivation, but frequent cultivations throughout the summer naturally lessen the amount of water necessary to maintain vigorous growth. Aside from conserving moisture, cultivation opens and aerates the soil, thus making it more receptive to moisture. In bulletin No. 112 of the Oregon Agricultural College, entitled, "Orchard Irrigation Studies in the Rogue River Valley," the authors conclude that, "cultivation is a most important feature to be considered in connection with irrigation. With thorough cultivation early in the spring and the maintenance of a good soil mulch during the season, the soil will be in better condition to receive water when needed. Irrigation should merely supplement good tillage and the importance of thorough tillage during the season cannot be over-estimated." There is no question but that a good dust mulch reduces evaporation losses. In a series of experiments conducted by

Many of the orchardists make the mistake in not cultivating soon enough after irrigation. As soon as the soil is dry enough to work, the cultivation should begin. On the lighter and sandier soils, one can begin cultivating in about 24 hours after each application, while on the heavier type, it will be from 48 to 60 hours. It should also be borne in mind that in the development of the young orchard, it is a good plan to grow some annual crop between the tree rows for the first four or five years. No crop, however, that does not permit of cultivation should be grown. Here in the Northwest such crops as cantaloupes, strawberries, potatoes, corn and lettuce are quite common. In Idaho, lettuce is now more generally grown, since ideal conditions exist for the production of this salad crop.

Irrigation in the Bearing Orchard.

Investigations show that some orchardists of the Northwest use a permanent cover crop in the orchard, while others are in favor of alternating a cover for two or three years with clean cultivation for a like period. Many of the growers in the Wenatchee district, who have been harvesting such tremendous yields during the past few years, have had their orchards in permanent cover crops. Those crops commonly grown for this purpose are alfalfa, clover, vetches and peas. Whatever crop is used, the benefits are much the same in that a crop of this kind improves the condition of the soil by the addition of humus and nitrogen. In addition, the cover protects the soil in winter, and lowers the temperature in summer. The lowering of temperature has considerable weight with many growers and for this reason they prefer to have their orchard permanently in clover or alfalfa. In handling an orchard of this kind, it is the practice to disc in the spring and follow with a smoothing harrow. In some instances, the first crop is cut for hay while the second is allowed to remain in the orchard.

We should keep in mind, however, the fact that with any cover crop, larger amounts of water are necessary. It is known that alfalfa requires two and five-tenths acre feet per acre for the season on the better types of soil, hence, where a rank cover is growing in the bearing orchard, possibly up to three acre feet per acre will be required. Some growers claim that on clay soils from 20 to 24 acre inches per season will be required while the sand loams will need from



Growing head lettuce in the young orchard.

the United States Department of Agriculture, it was shown that a dry three-inch mulch makes a saving of 57 per cent of the water lost from the unmulched surface, and that deeper mulches make even a greater saving.

30 to 36 acre inches. It is well to remember that sufficient water must be applied both for the cover crop and for the trees. In those sections where there is a shortage of water, cover

(Continued on page 14.)

The Inside Story of the Apple

Part III.—The Alternate Bearing in Apples

by J. R. Magness

United States Department of Agriculture

THE CAUSE of alternate bearing in apples has been discussed as widely as any subject in connection with fruit growing. The tendency for trees of certain varieties of apples to produce tremendously heavy crops one year, followed by practically complete crop failures the year following, is most undesirable from the viewpoint of the commercial orchardist. The correction of this habit is very difficult and requires exceedingly careful, intelligent and sustained effort on the part of the orchardist if it is to be accomplished.

Alternate bearing is being discussed at this place in this series because it is intimately associated with the formation of fruit buds, which was taken up last month. Typical alternate bearing in apples is caused primarily by a failure of the tree to form flower buds one season, followed by the formation of a superabundance of flower buds the season following. Since very few, if any, fruit buds are formed during the season of heavy production, there will be no blossoms the spring following, and no possibility of a crop. Other agencies, such as frost at blossoming time, lack of pollination, etc., may cause a crop failure; but crop failures so caused must be considered separately from the crop failure caused by lack of blossom bud formation.

Requirements for Fruit Bud Formation

It will be recalled from the discussion last month that research work of recent years has thrown much light upon the conditions necessary within the tree before fruit bud formation will take place. These requirements are a relative abundance of the food materials formed in the leaves—the sugars and starches and related materials—in proportion to the amount of nitrogen. We also pointed out the fact last month that a spur is to a certain extent dependent upon the leaves borne immediately upon it for its supply of these foods, but that its supply is also related to a very considerable extent with the supply of the tree as a whole.

Effect of Producing Fruit Upon the Carbohydrate Supply to the Buds

When an apple is being produced upon a spur, the food material which goes into the apple is mainly that produced in the leaves. Consequently, the fruit is competing with the buds for the carbohydrates being formed. An apple is about 85 per cent water, and the remaining 15 per cent is formed almost entirely of material produced in the leaves, consisting of sugars, starch, pectin, acids and other materials formed from sugars.

It appears that these food materials will pass into the apple which is being produced very readily, so that they do not become abundant in the spurs upon which the fruit is growing. If other spurs are nearby, which are not bearing fruit, part of the sugars and other materials formed in the leaves on these non-bearing spurs will also pass over to the spurs producing fruit, and hence into the fruit. This is in accord with the suggestion last month that these food substances move in the plant from the regions where they are most abundant to the regions where they are least abundant.

Thus it can readily be seen that if a fruit is being produced on a spur, there is little probability of a sufficient quantity of food material accumulating in that spur to form a fruit bud at the same time. It is also probable that the fruit being produced upon one spur will have a slight effect upon the food materials in spurs nearby, which themselves might not be producing fruit. Now if a large percentage of the spurs are bearing fruit—as occurs in years of exceedingly heavy crops—what will be the result? Not only will the spurs on which the fruit is being borne fail to form fruit buds, but the spurs which are not bearing fruit will also be low in carbohydrates, due to the heavy drain

of the crop upon the tree as a whole, and the movement of food materials from the non-bearing spurs to those which are bearing. As a result, there will be very few fruit buds formed, and the following year there will be very little fruit produced.

Conditions in the Tree During the "Off" Year

From the above discussion, it is apparent that there will be little fruit in many varieties, following a year of real over-production. Consequently, the large quantity of sugar and related material from the leaves, which would normally be consumed in producing fruit, accumulates in the tree, and we find every bud and twig and branch full of these materials by mid-summer. Due to the fact that there is such a large quantity of these materials in the tree as a whole, even spurs with a few leaves which normally would not form blossom buds, may have a sufficient accumulation of carbohydrate material to form fruit buds. Also the few spurs which are bearing fruit, aided by food material from nearby leaves, may again form fruit buds. Thus the spring following, the tree will be a bower of blossoms, with prospects for a barren or semi-barren year to follow.

From the foregoing discussion, it will be seen that once the tree is firmly established in the alternate bearing habit, rather vigorous measures will be required to get it back into annual bearing. Indeed it has not yet been thoroughly demonstrated that it is possible to break the alternate bearing habit of such varieties as Baldwin, grown in northern latitudes, once the habit is firmly established. Much progress is being made, however, in the study of methods of handling these problems, and it is not too much to hope that within a few years this most difficult problem will be solved by a large percentage of progressive orchardists.

The Start of Alternate Bearing

Alternate bearing has long been termed a "habit" of apple trees, and the term has been well chosen. For the "habit" results from certain specific causes, and considerable effort is necessary if it is to be broken. Like most "habits," alternate bearing can be prevented more easily than it can be cured.

Anything which results in a total or nearly total loss of a crop after apple trees are once bearing may cause the beginning of alternate bearing. Thus a frost, which destroys the blossoms for one season may result in over-production of blossoms for the season following, and consequently over-production. Even without any agency which entirely destroys a crop, the trees may produce

a heavy crop one season, with a lighter one the year following. Following a moderately light crop, a very heavy one will be produced, and the trees will thus gradually work into the alternate bearing condition.

Breaking the Alternate Bearing Habit

The discussion of principles involved in alternate bearing is of little value to the commercial apple grower unless it indicates to him how he can best undertake to control this condition.

There are two points to consider in breaking up alternate bearing in apples. One point is to prevent the formation of an excess of fruit buds during the off year, the other is to work to secure a maximum of fruit bud formation during the bearing year. Most methods of handling the trees to secure the one will automatically tend to bring about the other.

Reducing the Number of Fruit Buds Formed During the Off Year

There is no satisfactory method of reducing the number of fruit buds which will form during the off year, except to reduce the actual number of buds and spurs present by pruning. Many trees firmly established in alternate bearing have great numbers of spurs and twigs in the top. It is not possible by any practical means to prevent the formation of flower parts in the buds borne on these spurs. Partial defoliation—the removal of a large part of the leaves—might do it, but this is not practical on a commercial basis. But it is possible to reduce the number of spurs, and thus the number of blossoms that will form, by a vigorous pruning treatment.

This pruning should be done during the early spring or winter preceding the "off" growing season. Pruning should be vigorous, but should be aimed at the small twigs and spurs, rather than at large branches. Severe cutting throughout the top of the tree, with the removal of large numbers of small spurs and twigs, is essential if much is to be accomplished. There is little danger of cutting too heavily on old, established trees, particularly if the cutting is confined to small twigs and spurs. The removal of half the buds from old trees which have become "twiggy" and are making little annual growth will probably not be any too much.

This treatment will accomplish two things. It will reduce the number of buds, thus reducing the number of blossoms and the number of fruits. Consequently the individual fruits will be larger. It will also stimulate growth in those spurs and twigs which remain, and result in more leaves per spur. But of most importance from the standpoint of securing annual bearing, is the production of new growth

on the branches throughout the tree, for it is upon new growth that the hope of breaking the alternate bearing habit largely rests.

The buds formed upon new growth are farther removed from the bearing spurs than are non-bearing spurs upon the old, fruiting wood. If a very heavy crop of fruit is being produced, fruit bud formation will be greatly reduced in spurs near where the fruit is being borne. But in spurs on new growth, which are more distant from the fruiting spurs, there is much less effect of the drainage of food materials toward the fruit.

If trees are making a vigorous growth, numerous new spurs, largely uninfluenced by the crop in the older part of the tree, will be produced each year. In the buds on these spurs, it is possible to get flower parts formed even in years when the older portions of the tree are producing heavily. Once some fruit is secured in the normal "off" year, the battle is half over. Fairly vigorous pruning of the type described above, coupled with growth promoting conditions in the orchard, will in most cases gradually cure the alternate bearing habit.

In order to secure good growth in the trees, nitrogen fertilizers are essential in many orchards, in fact, in most orchards growing in sod, the use of nitrogenous fertilizers will result in better growth in the trees, and consequently will aid greatly in correcting the tendency to bear alternately. Coupled with a supply of available nitrogen, adequate moisture is necessary if the growth, so vital to the correction of alternate bearing, is to be secured. Good growth during both the "off" and "on" years, coupled with a pruning treatment to reduce the number of old spurs previous to the "off" growing season, will go far to correct the alternate bearing habit.

Thinning the Fruit

It was long believed that thinning the fruit during the season of heavy production would result in greater fruit bud formation for the year following. By practical experience, however, as well as experimental studies, it has been found that the commercial thinning season comes too late to have a marked effect upon fruit bud formation during that season. Thinning of the fruit to secure an immediate increase in fruit bud formation would have to occur practically in the blossom stage—a commercial impossibility, even if desirable. By the time the fruit is large enough that the need for thinning can be determined, it is too late to be of marked benefit from the standpoint of fruit bud formation.

Varieties and Alternate Bearing

This discussion should not be closed without a reference to the relative ease with which various varieties can be made to produce a crop regularly. Certain varieties are known for their regular bearing. Jonathan, Grimes, Delicious, Winesap, Ben Davis and other varieties will produce year after year without special attention. On the other hand, York Imperial, Yellow Newtown, Baldwin, Northern Spy and other varieties must be handled very carefully if regular crops are to be secured. This is a very important consideration in determining the varieties to plant. But for the orchardist with varieties which produce crops alternately, a vigorous series of treatments of pruning and fertilization to induce annual growth will probably go far to correct the habit.

The setting of the fruit will be discussed in the next article in this series.

Although I have studied agriculture for over 25 years, I have gathered very much valuable information from your paper and I would not be without it if the subscription rate was three dollars per year instead of three years for one dollar.—Joseph H. Haselbauer, New York.

Our Editorial Comment

Word From the New Editor

YOUR new editor assumes the duties of the position with a feeling of very great responsibility, for it is no small task to direct the editorial work for a magazine which reaches almost a quarter of a million fruit growers every month—men and women who represent one of the most advanced classes of our agricultural population. In the first place, it will be no small matter to follow a man like Prof. C. I. Lewis. Prof. Lewis was one of the horticulturists of the country who understood the industry both from the technical and practical viewpoints; he understood both the growing and marketing sides; he was familiar with all the important fruit growing sections of the country; he was an affluent and effective writer. His wonderful work with this magazine for the past few years needs no comment. Both the industry and the magazine lost a great horticulturist when Prof. Lewis left us.

In the second place, it is a tremendous task to undertake to give information, and to lead others to do so, for such a great enterprise as American fruit growing. The business is not on a standstill by any means. Some of the brainiest men in the country are in the business, and these, along with the experiment station men and other scientists, are constantly developing new and better methods of production, and we must keep in touch with what is going on in these directions so that we may present to the readers the latest and best information on the subjects pertaining to the industry.

Fruit growing, while one of our oldest industries, has been handicapped by many traditions and customs which are based on general belief rather than on absolute fact. In other words, some of our operations have been performed certain ways just because it has been the custom to do them that way. For instance, the facts of fruit bud formation have been known for many years, but it took men like Tufts of California and Roberts of Wisconsin to pull this information together and adapt it to our practical operations in the field.

It is an editor's business to sort out the good from the bad so that he may present to the readers such information as is based on fact, and he must help to point out such things as are not based on fact.

When General Manager Walker and his associates talked with me about coming with the paper, I was delighted when they emphasized that the paper had a balanced policy in regard to production and marketing. They said they recognized that a successful horticulture depended both on successful production and successful marketing and that neither alone would suffice. This is a program which I can enthusiastically enter into and support. The marketing question involves fully as great a responsibility as that of production. The marketing question has been much before the growers the past few years, and I am sure that growers everywhere have been watching the development of co-operative marketing. Success has followed many co-operative efforts, while in many cases, the associations have failed. Why the difference? When analyzed, good reasons will usually be found for the success or failure of a co-operative enterprise. Some people will offer advice lightly on such a question, but in my opinion, it is a most serious responsibility to give advice on a question which involves millions of dollars, and this matter should be approached with the very greatest of care. It will be our policy to make sure that such advice as we may give will be based on sound principles.

An editor does not and cannot alone make

a successful paper. The success of such a paper as the American Fruit Grower Magazine depends, in a large measure, upon the co-operation given by experiment station horticulturists and other leaders in the industry. I hope that it will be possible to secure the same co-operation from these leaders in the future as in the past.

I have been connected with the horticultural industry all my life. All that I am, I owe to horticulture. If I have accomplished anything worth while for the industry, I owe it in return to horticulture, for it is the industry that has provided the opportunity. I have always enjoyed my work in horticulture and I feel that I shall enjoy this new work better than anything I have ever done. I pledge myself, both to the readers and to the owners, to do all within my ability and energy to make the paper a splendid success.

Financing the Fruit Grower

FRUIT growers must be financed. The need for it is even greater than the financing of industry. The orchards are the foundation of the nation's prosperity. When orchard returns per acre are low, failures among business concerns increase. Whatever promotes the fruit growers' prosperity, promotes general prosperity.

Recognition of this fact is responsible for the enactment of the Farm Loan Act, under which Federal Land Banks, National Farm Loan Associations and Federal Farm Loan Bonds came into being. These banks, associations and bonds, provide the fruit grower with a source for financial help at a reasonable cost. He may free himself from the clutches of some Shylock, who has formerly loaned on the property, add to his land holdings, buy orchard machinery, construct or repair buildings and repay the loan in small installments. For example, the borrower takes out a Federal Farm Loan for \$1000 at five and one-half per cent interest. He agrees to pay \$65 a year for 34½ years. The first year practically \$10 is applied on principal and \$55 pays the interest at the regular rate. Each year thereafter a larger amount is applied on principal as the interest due becomes correspondingly less, and the entire loan is liquidated in this way within the period stated.

The fruit grower who desires a Federal Farm Loan is referred to the executive officer of the nearest National Farm Loan Association, known as the secretary-treasurer. His orchard is then appraised by a loan committee of three members. The men composing this committee are thoroughly familiar with local conditions, and as the Association guarantees prompt payment of principal and interest, the committee has every incentive to be conservative in the appraisal.

The amount of the loan must not exceed 50 per cent of the value of the land, plus 20 per cent of the value of the permanent improvements. In no case may it exceed \$25,000, and loans of \$10,000 or less are given preference. It is further required that the borrower personally supervise the orchard to be mortgaged. The borrower must also agree to use the money received for certain approved purposes. No loans can be made to landlords who rent, or for speculative purposes.

If the application is favorably reported by the local loan committee, it is forwarded to the Federal Land Bank serving that district. The property is then re-appraised by an appraiser appointed by the Federal Farm Loan Board, and before the mortgage is accepted as security for Farm Loan Bonds, the application and appraiser's report must be approved by the Securities Division of the Federal Farm Loan Bureau in Washington.

Upon taking out the loan, the borrower becomes a member of the local association to which he subscribes for stock, an amount equal to five per cent of the value of his loan. He further assumes a personal liability for the debts of his association equal to the value of his stock. This constitutes the familiar "double liability," such as is assumed by stockholders of National Banks. The Association in turn guarantees to the Federal Land Bank the prompt payment of principal and interest and invests the money received for its stock in the stock of the Federal Land Bank.

The 12 Federal Land Banks are located at: Springfield, Mass.; St. Louis, Mo.; Louisville, Ky.; Columbia, S. C.; New Orleans, La.; Wichita, Kan.; St. Paul, Minn.; Houston, Tex.; Berkeley, Calif.; Omaha, Nebr.; Baltimore, Md.; Spokane, Wash.

Small Fruit Department to Be Started

IT IS the aim of the American Fruit Grower Magazine to present to its readers each month articles by the leading horticulturists of the country. We are conducting a number of departments regularly, each of which is handled by an outstanding man or woman in his or her field. In keeping with this policy, we are adding a new department to the magazine this month. This department will be known as the "Principles and Practices in Small Fruit Culture," and will be edited by Dr. A. S. Colby, Associate Chief of the Department of Horticulture of the University of Illinois. Dr. Colby is particularly qualified to handle this department and has specialized on small fruits for a number of years and we believe is one of the best qualified men to write on the subject. Our readers will find his material thoroughly up-to-date and trustworthy.

IN ANNOUNCING Charles E. Bassett of Fennville, Mich., as the new special editor of the two departments, "Markets and Marketing" and "With the Co-ops.," the American Fruit Grower Magazine feels that it is offering the experience and ability of one of the best known and best posted men in America, in these two important lines.

Mr. Bassett has been a successful fruit grower for years and lives on his farm in one of the most important fruit sections of a leading fruit state. For 15 years he was the secretary of the Michigan State Horticultural Society. As a recognition of what he did for the fruit industry, the Michigan Agricultural College gave him the honorary degree of Master of Horticulture. Ten years ago he assisted in organizing the Bureau of Markets in the United States Department of Agriculture at Washington, and for five years he was its specialist in co-operative organization. In this capacity he assisted in organizing numerous successful co-operative shipping associations and acquired a national reputation as an authority on organized marketing.

Five years ago he resigned his government position to take up active marketing work with the North American Fruit Exchange, as its director of organization. When that Exchange was taken over by the newly formed Federated Fruit & Vegetable Growers, he continued in the same capacity until last October, when he resigned to look after his own fruit interests.

Having been in actual contact with every important fruit section of America for 10 years, Mr. Bassett will be able to handle their problems fairly and fully and to the satisfaction of thousands of our readers.

The Prevention of Storage Scald

by Clarence E. Baker
Purdue Agricultural Experiment Station

STORAGE scald of apples is probably the worst non-parasitic disease with which the fruit grower has to contend as it causes greater annual losses than all other storage diseases combined. It is found both in the commercial storage plant and in the farm cool storage, sometimes completely destroying the market value of a fine crop of apples without apparent warning. Although its cause and behavior are still poorly understood, it can now be largely prevented by following certain practices, which will be set forth later. Varieties most susceptible to scald attacks are: Grimes, York Imperial, Rome Beauty, Black Twig, Rhode Island Greening, Stayman, Wagner and Baldwin, but it occurs at times on almost every variety of apple.

Most growers of Grimes or York Imperial are familiar with the disease as it appears on the apple in storage, or after it has been removed, and recognize it as an irregular brown tint spreading over the skin in mild cases, or entirely killing the skin to the extent that it will slough off when handled, giving the disease the appearance of a rot. It can be distinguished from a rot, however, as rots usually spread down into the flesh in a more or less conical shape, while scald is diffused over a considerable surface of the apple to the depth of only a few layers of cells. Once the skin is killed by scald, rot organisms enter the fruit and proceed with its destruction.

Regular scald must be distinguished also from its companion storage disease of Jonathan and Rome Beauty, known as soft-scald. The latter disease differs from regular scald in that it is found on the blushed side of the apple, extending over the fruit in peculiar patterns, while regular scald is usually found on the greener portion of the fruit. In appearance, soft-scald closely resembles frost injury, the affected tissue being soft, watery and slightly sunken. The line of demarcation between the affected and healthy tissues is much more sharp, however, than in the case of frost injury. On red fruits the color of soft-scald is usually whitish or pink, which becomes light brown after exposure to warm air. Soft scald usually occurs only with temperatures below 32 degrees and its seriousness is increased by delayed storage and poor ventilation.

In comparison with regular scald, soft-scald is of small importance. Control measures discussed in this article are applicable to regular scald only, as the two diseases are distinct and do not yield to the same methods of prevention.

Prevalent Opinions Regarding Cause of Scald

Many times apples, when examined in storage and appear to be perfectly sound, show a large amount of scald after they have been in warm air for a few days. This fact has formed the basis of a serious misconception regarding the real cause of the disease and leads to the prevalent opinion that scald is due to the warming of the fruit after its removal from storage. This, however, is not the case, but as we shall see later, the damage was done during the early storage period, giving the fruit the potentiality to exhibit the disease as soon as it is put under favorable conditions. It is true that warm air often causes the disease to become evident, but the cause of the disease goes back to some condition under which the fruit was held during the first few weeks it was in storage.

Low storage temperatures have also been held responsible for the damage but this idea, also, is without foundation.

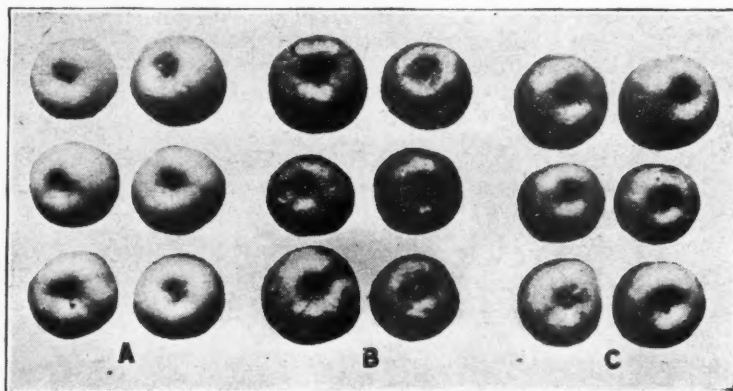
Relation of the Ripening Process to Scald Development

To understand thoroughly the true conditions bringing about apple scald, it is necessary to understand the life processes taking place within the

apple itself during the harvest and storage periods. It must be remembered that when the apple is removed from the tree it is a living organism whose life processes are still going on. At this time the apple is hard, sour and not sufficiently ripe to be palat-

an accumulation of carbon dioxide rather tends to prevent scald.

During the ripening process, however, other products of respiration besides carbon dioxide are thrown off, among which are esters—organic compounds that give the aroma to the



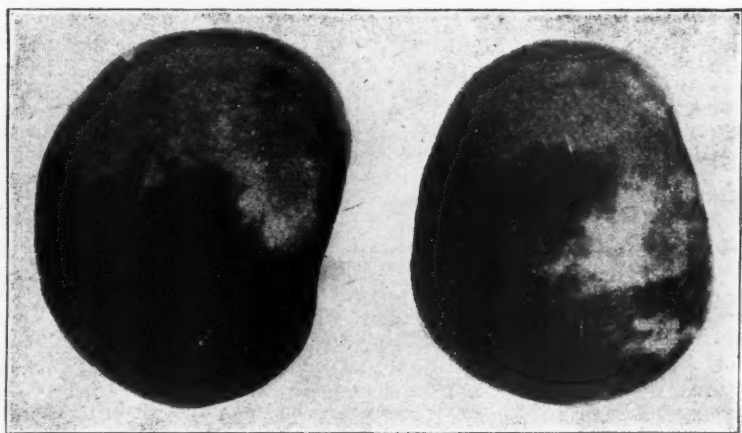
Scald on Grimes apples effectively prevented by the use of oiled paper. A—Typical of apples wrapped individually in oiled paper. These remained scald-free throughout their storage season. B—Typical of untreated fruit. Scald developed after about two months in storage and by the end of the normal storage period for this variety, these apples were worthless. C—Apples packed in shredded oiled paper. This method gave practically as good control of scald as did wrapping each individual apple.

able. After picking, the life processes continue, the starches are changed to sugars, the acid disappears, the apple becomes soft and edible. If this process is permitted to go on unchecked, the apple finally reaches maturity, it becomes mealy, losing its flavor and aroma and eventually disintegrates completely. This process progresses rapidly at warm temperatures.

To slow up these life processes and to keep the apple in a high state of

fruit. It is an accumulation of these about the fruit that cause it to scald. It has been found that if these are removed during the early ripening period, scald can be prevented. That these fruit esters are responsible for scald has been demonstrated artificially by producing scald on apples by exposing them to the vapors of certain dilute esters.

If it were possible to remove these gases by ventilation, the control of scald would be more simple, but to be



Typical scald injury on Rhode Island Greening. Scald usually appears on the green or unblushed side of the apple, spreading over the surface as a brown tint. As the disease progresses, the tissues directly beneath the flesh become dead and brown.

palatability over a long season, storage is resorted to, but it must be remembered that even at temperatures as low as 31 and 32 degrees, these changes are slowly taking place within the apple. As in an animal body, respiration is slowly going on. Oxygen is being absorbed to aid in carrying on these internal processes and carbon dioxide gas is given off in large quantities, together with other waste products of respiration. It is at this point that the relation of scald is directly connected to the development of the apple, and here again lies a prevalent misconception, namely, that the accumulation of carbon dioxide gas causes the scald. This is not the case, for it has been established that

efficient ventilation must reach the surface of all the fruit. In storage rooms stacked several tiers high with fruit in tight packages, this is impossible and other means must be employed.

The Evolution of the Oiled Wrapper

Dr. Charles Brooks, of the United States Department of Agriculture, and his associates, who conducted the above investigations, have been working on this problem for several years and have devised methods of control. Utilizing the ability of fats and oils to absorb odors and gases, they tried successfully to prevent the accumulation of these harmful gases by absorbing them in fats. In the course of

their experiments many substances and means of using them were studied with the oiled wrapper as the ultimate result. An odorless and tasteless type of mineral oil has been developed which does not affect the taste or quality of the fruit in any way. Ordinary animal or vegetable oils become rancid after a time and injure the flavor of the fruit. Paraffin wrappers have reduced the amount of scald only slightly and consequently have not proved worthy of use.

It has been found that when Grimes were stored in oiled wraps, scald did not result when the oiled wraps were removed and replaced with common paper after a short time as one month. This indicates that the injury occurs during the early part of the storage season and emphasizes the value of prompt wrapping. High temperatures during the first few weeks after harvesting time hasten the ripening process and aggravate scald injury. It has also been found that scald development can be arrested after several months of storage by the use of oiled wraps.

Mineral oil wrappers are now being made by several commercial concerns and are being used in increasingly large quantities each year, especially in the Pacific northwest. In buying oiled wrappers, the most important point of consideration is the amount of oil contained. Experiments have established that to be most efficient the wrappers should contain 15 to 20 per cent of oil by weight. In buying oiled wrappers, the purchaser should demand a definite statement from the manufacturer as to the amount of oil contained. Most of the oiled wrappers on the market contain about 15 to 18 per cent of oil at the time of their manufacture. Formerly the oil content ran from three to five per cent and that small amount of oil will not control scald.

Recent Developments in Oiled Paper Protection

Since the establishment of scald control by the use of the mineral oil wrapper, several commercial products have appeared upon the market other than the regular oiled wrapper. One of these products is a wrapper both chemically processed with Bordeaux and oiled. Beside controlling scald, the wrapper is supposed to check the development of rots and molds.

One of the most interesting supplementary products is a shredded oiled paper, presumably a waste product from cutting oiled wraps, to be distributed through the package about the fruit. This product is still in the experimental stage, but if a sufficient quantity is used to absorb the products of respiration, and if it is distributed in such a manner as to be in intimate contact with all of the fruit, it may work satisfactorily. Sheets of oiled paper for separating the layers of fruit and for lining the sides of the package are also available and should prove a valuable addition when used with shredded paper packs.

Purdue Experiments

Last fall the experiment station outlined investigations dealing with storage problems, one series of which deals with the prevention of scald by the use of oiled wraps and shredded oiled paper. These investigations are being carried on with several varieties of apples subject to scald, in our new cool storage house at Bedford, Ind., and also in a commercial cold storage plant in Indianapolis. Although the first season's work is not yet completed, some very interesting results have been obtained.

In view of the fact that Grimes is one of the most important commercial varieties in this section of the country, and also one of those varieties most susceptible to scald, our results with this variety are of considerable interest to both the fruit growing and the fruit consuming public.

Under the conditions prevailing in
(Concluded on page 21.)

Thinning Deciduous Fruits

by Warren P. Tufts

University of California

THINNING the immature fruit is one of the most essential orchard operations because crowded fruit cannot size properly and neither will the color, texture and flavor be of the best. Considerable thinning is done when the trees are pruned. These two operations are therefore so closely related that one cannot be discussed without a consideration of the other.

Little experimental data exist for guidance in thinning. Most growers, however, have demonstrated to their satisfaction that the operation pays. This is particularly true with apricots, peaches and shipping plums. It is the aim of this article to present as briefly as possible certain general considerations, as well as practical suggestions, for the carrying out of the work.

Reasons for Thinning

Thinning may be defined as the removal of a certain portion of the fruit crop from the tree in order to: Improve size, color, texture, flavor and individual uniformity; prevent breakage of trees by better distribution of crop; reduce disease and insect injury; maintain vigor of the tree; secure more regular bearing; and decrease labor of handling crop.

It has been the common experience of growers, and many actual tests have shown, that where there is a heavy set of fruit, the reduction of the number of specimens will, as a rule, result in better average size, color and uniformity and enhance the general attractiveness of the entire crop.

Frequently, either on account of improper thinning of fruiting wood at the dormant pruning, or an unusually favorable season for fruit setting, trees may be so loaded that much breakage will result unless the weight of the crop is reduced by thinning.

Certain diseases and insects flourish where fruit is closely crowded on the branch. In order to control these pests, it is necessary to break up the clusters. The codling moth, which causes wormy apples and pears, delights in making its entrance where two fruits touch. Brown rot of the stone fruits is more rapidly spread when the fruit hangs in dense clusters or even touches.

Bigelow and Gore¹ a number of years ago reported the average composition of six varieties of peaches at different stages of growth. The results are given in Table 1.

A study of these figures discloses several interesting facts. The proportion of total solids in the pits (stone and kernel) of the peach, even at a relatively early stage of development, is comparatively great. From this, it may probably be safely concluded that the bringing to maturity of a large number of pits is a greater drain upon the tree than the ripening of a smaller number of fruits, which on account of larger size, aggregate the same weight. It is a matter of common knowledge that the size of the pit in the stone fruits varies very little between large and small specimens of the same variety. Inasmuch as the solids in the pits are proportionately much less before the stone hardens, it would seem desirable to thin as soon as possible after all natural shedding of superfluous fruits has stopped. These facts would seem to indicate that the vigor of the tree may be maintained by judicious thinning.

Many statements have in the past been made to the effect that thinning, by not allowing all spurs to produce any one season, will prevent the alternation of bearing which seems to be the fixed habit of some apple and pear varieties. Carefully checked experiments have shown this assumption to be incorrect, except insofar as a heavy crop one year tends to deplete the resources of the trees for the following season. With the stone fruits, a very heavy production one year is almost

always followed by a light crop the next, unless utmost care is taken with all orchard operations.

Thinning so as to decrease the number of fruits to be handled at harvest time materially reduces picking, grading and packing costs. Lessening the number of fruits does not necessarily mean less tonnage. Thinning is apt

integral part of the pruning system.

Plant food materials before being assimilated by the tree in carrying on its activities, must be transformed in the leaves into rather complex plant foods, and there is some evidence to show that much of this food is utilized near the point of manufacture. Having this fact in mind, it may be argued



Cluster of apples setting from one fruitbud. For best results only one fruit should remain after thinning.

to result in considerable increase in size. The canners of California have adopted as a slogan, "one two-and-a-half-inch peach weighs as much as two two-inch peaches."

General Considerations

The fruit tree utilizes all its energies in: Wood growth; fruit and seed production; fruit and leaf-bud formation; and manufacture and storage of reserve food materials.

On the different orchard operations which modify these life processes, probably no other one has such a profound and immediate influence as pruning. Any pruning system, which results in a greater storage of plant food reserves, the formation of more fruit-spurs and fruit-buds, and consequent modification of new wood growth, is most intimately associated with the question of fruit thinning, in fact, the thinning of the fruit is an

that more fruit can be brought to a satisfactory maturity on shoots or spurs having a comparatively large leaf area. Field observation offers convincing proof of the correctness of this assumption.

Young trees, especially with a vigorous vegetative growth, tend to set fewer fruits than slower growing mature ones, and as a rule need less thinning. There is likewise a distinct varietal difference in the ability of the various sorts to size their crops. The Winesap variety of apple, for example, needs far more thinning than the average.

Soil and moisture conditions must be favorable. Thinning cannot be made to atone for poor cultural treatment. Naturally more fruit may be left under ideal conditions than where there is a deficiency in either soil moisture or fertility. Also it should be stated in passing that during the

early development of the fruit, should there be a lack of available moisture in the soil, the leaves have the ability of withdrawing water from the fruit. This condition may readily proceed so far that the fruit is unable to recover even with copious irrigations at a later date. Keep the soil moisture at the optimum at all times.

Much of the thinning work may be accomplished at the annual dormant pruning, at less expense, by the judicious selection and distribution of fruiting wood. With certain fruits, however, even with the most careful pruning, a portion of the fruit must be removed after the first and second "drops" or the trees will tend to overbear. Attempts at thinning the fruit at pruning time in some localities where there is more or less of a frost hazard, may result, in unfavorable seasons, in greatly reduced crops.

It has already been pointed out that thinning is best done as early in the spring as the habit of natural dropping permits. This will vary for different localities and fruits. The so-called "June drop" in reality in many fruit sections of California takes place in April or May. A satisfactory explanation of this phenomenon has yet to be proved experimentally.

The actual operation of thinning is accomplished in various ways in the different fruit districts. The only satisfactory way is removal of the undesirable fruit with the hand, never by shaking or knocking with a pole.

By the latter methods fruit-spurs are broken, even spacing of fruit left is impossible, and no discrimination can be made between good and bad specimens. Fruit made unsalable by insect injuries, plant diseases, frost and mechanical malformations can be removed when thinning is done by hand; otherwise many of these specimens will remain on the trees until harvest and the handling of these culls will impose a further burden at a very busy season.

Specific Recommendations

Apple.—The fruit-bud of the apple produces a cluster of flowers, several of which usually set fruit, but only one as a rule should be left at thinning time. When there is a heavy set, some spurs must be deprived of all their fruit so that when the apples are ripe they will be from four to six inches apart on the branch. Some varieties, such as the Winesap, must be thinned even more severely so that the fruits possibly are not closer than eight or 10 inches. When the crop is not so heavy and growing conditions are favorable, then it may be permissible to leave two specimens to the spur.

Apples should generally be thinned immediately after the June drop. However, under certain conditions and with some varieties, notably the earlier maturing sorts, by delaying the thinning for a time, it has been found possible to profitably dispose of the immature fruit for culinary purposes and at the same time secure proper development of the main crop.

Specially designed "thinning shears" are on the market for use in apple thinning, but the use of these with most varieties will not prove faster than removal by hand. Furthermore, there is danger of injuring the specimens left with the sharp points of the shears.

Apricot.—Apricots should be thinned so that no two specimens will touch when ripe. Ordinarily the young fruits should not be left closer than from three to five inches on strong shoots and only one fruit to each short spur. Two fruits may be left near together on opposite sides of the branch or even on a short spur, if no other fruits are closer than four or five inches.

In sections where brown rot is prevalent, great care should be taken to see that fruits do not touch when ripening. In clusters of apricots, there is often enough moisture between fruits that touch each other to

(Continued on page 13.)

TABLE 1.—AVERAGE COMPOSITION OF SIX VARIETIES OF PEACHES AT DIFFERENT STAGES OF GROWTH.

Stage of Growth.	Weight of				Total solids in			
	Peach. Grams.	Flesh. Per cent.	Stone. Per cent.	Kernel. Per cent.	Flesh. Per cent.	Stone. Per cent.	Kernel. Per cent.	
June Drop.....	9.51	64.55	32.50	2.94	14.77	9.37	6.89	
Stone Hardened..	16.75	71.54	25.82	2.89	16.97	27.35	7.54	
Market-ripe	73.59	92.49	6.86	0.65	14.04	66.94	44.78	

¹Bigelow, W. D., and Gore, H. C., U. S. Dept. Agr. Bur. Chem. Bull. 97, 1905.

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The Non-Setting and Shelling of Grapes

by Arthur S. Rhoads

Missouri State Fruit Experiment Station

THE FAILURE of grapevines to set fruit, or to retain their fruit after it has developed more or less fully, is a trouble of considerable economic importance, the cause of which usually remains a mystery to the grower. Both the non-setting of grapes and their falling off after they have developed more or less fully is termed "coulture" by the French viticulturists.

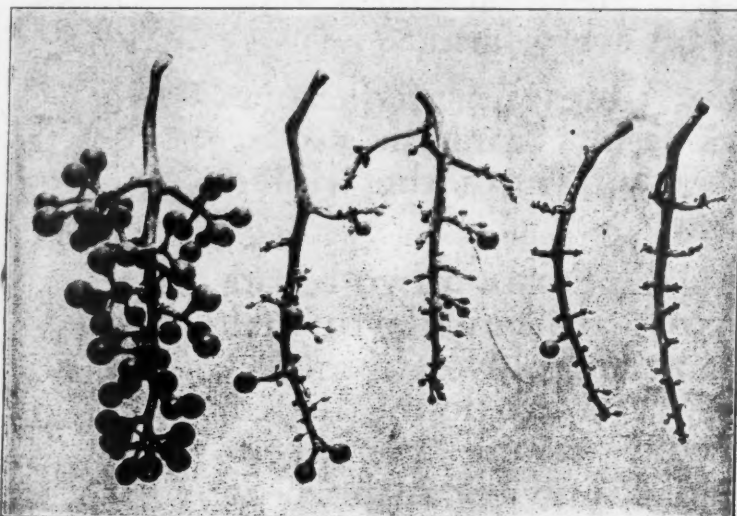
While the failure of the flowers to set fruit, or of the berries to develop appreciably, has long been recognized by European viticulturists, and some phases of it by American horticulturists and those engaged in grape-breeding experiments, this trouble has been given but scant attention by American pathologists. From a consideration of the American pathological literature, the impression is gained that the non-setting of grapes is of but little importance in comparison to the falling of the more or less fully developed fruit, or "shelling" or "rattles," as this trouble is designated commonly in this country.

Observations by the writer indicate that the non-setting of grapes is of far greater importance as a factor of loss than the commonly mentioned shelling. The undue prominence which shelling has attained in comparison to non-setting is largely due to the much greater conspicuousness of the loss caused by the former, the falling of some of the well-developed berries attracting the attention of even the most casual observer, whereas large numbers of the flower clusters may fail to set fruit or may even blight and drop off entirely within a few days and entirely escape the casual observer or excite but little comment as a rule.

In California, Bioletti has applied the term "early coulture" to the failure of the flowers to set fruit or of the

dropping of the berries without developing appreciably, and the term "late coulture" to the falling or shelling of the berries after they are well devel-

early coulture, if we accept the more convenient term, has been investigated by a large number of observers and a variety of causes assigned. These



Failure of Moore's Early grapes to set fruit as a result of the cold, rainy weather that prevailed during the blooming period. Normal cluster at the left. Five-eighths natural size.

oped. Bioletti's distinctions seem very appropriate and should prove useful, especially in the absence of any other term for the earlier form of this grape trouble.

The non-setting of the grapes, or

may be either constitutional or accidental.

Causes of Non-Setting of Grapes

Under early coulture as a result of constitutional causes, by far the most

important factor to be considered is the lack of self-fertility of certain varieties due to imperfect development of the flowers or to lack of functional activity of the pollen produced. The work of a number of investigators has shown that a large number of grape varieties are more or less incapable of setting fruit if planted alone, but that, like the pistillate strawberries, they must depend upon the pollen of other varieties for perfect fertilization and fruitfulness. In other instances, the flowers may seemingly be perfect in their organs and yet fail to develop fruit. In Europe this has been regarded as an inheritable character of certain vines, the only remedy for which appears to be ringing the vines, which tends to lessen the amount of water supplied and to concentrate the liquid nourishment carried to the flowers.

Early coulture, as a result of accidental causes, has been attributed to such factors as unfavorable weather conditions or fungous attacks occurring at flowering time, spraying while in bloom, improper pruning, a deficiency in the supply of reserve food materials in the canes, due to its depletion by excessive vegetative growth or by overbearing the preceding year, unsuitable or exhausted soil and the absorption of excessive material from soils extremely poor in nitrogen and phosphoric acid. The first two of these factors probably are the ones most frequently involved. A cold, rainy season alone will suffice to retard the fertilization of the flowers so that they may drop in greater or less number without setting fruit, or the fruit may develop for a time but quickly fall off before attaining any appreciable size, dropping off at every touch or jar of the vine. This often results in straggly bunches and the loss may

(Continued on page 24.)

The Savior of an Industry

by T. J. Talbert

University of Missouri

THE MARIONVILLE DISTRICT, situated 26 miles southwest of Springfield, in the heart of the Missouri Ozarks, is acknowledged to be one of the best apple growing sections in Missouri. About 2600 acres of orchard are now growing, and more are being planted every season. From between the orchards, vineyards and strawberry fields, one may see the imposing structure of the Marionville Cold Storage Co., a plant built by and for fruit growers and managed by fruit growers. Within sight of the building are many acres of the finest orchards that ever grew in the Middle West—the orchards that made famous that "Fruit with the Ozark Flavor." This is the project that is called the "Savior of an Industry," according to J. A. Neff, of Marionville, Mo., a senior student in the Missouri College of Agriculture.

Mr. Neff continues as follows: "Any commercial fruit grower is familiar with the need of 'saviors' at various stages of the game, and the Marionville district was no exception to the rule. The Marionville Cold Storage Co. was organized BECAUSE it had become a necessity for the growers of the community to have their own storage, one in which they had a managing voice, one in which they had complete confidence. Before the organization of the company in 1916, the question of storage for the huge apple crop of the district was a question of concern to all growers. Cold storage facilities were at a premium. The nearest was a small private plant at Aurora, six miles away, which, although excellent, could not serve more than a fraction of its own territory. Failing to get space there, the grower had to ship his fruit to distant storages. Such a situation left the apple grower at a disadvantage to every one with whom he dealt. He had but two choices: Take the price offered by the fall buyers, or ship his

crop over a long rail haul to a distant storage of which he knew nothing.

"Since there was almost no storage to be had locally, the grower was tempted to sell the crop at harvesting time or before. He was at the mercy of any or all buyers, and, sorry to say, most of them took advantage of the fact that there was no storing point and that the grower must sell at once. This situation made the fall selling prices usually low, leaving the grower little chance for profit. The grower who was willing to hold the crop was very little better off. First

he had to get cars—often poorly iced—to ship his fruit to the storage point. Many were the barrels of apples which had begun to deteriorate before they ever reached the storage. Many of the storages open to growers of the district were poorly managed. If the ultimate buyer was not conscientious, he telegraphed to the owner that his fruit was unfit for market, or made some other statement aimed at breaking down prices. Here again the grower was at the mercy of buyer and storage management. This system of storage also lost the grower the per-

sonal touch of being able to see his own fruit and to make his own sales; he could only take what was offered him; there was no recourse from unsatisfactory transportation service or poor refrigeration. As a third factor entering into the discontent was the fact that since one cannot always guess the trend of market, the fruit was often made to retrace its steps back through its own community to a market far on the other side; this added greatly to the deterioration during transit, and added expense to the budget. And for all these ills there was but one host: The fruit grower; he did the work and the worrying; he paid the bills and took the blame. At the end of the 1915 season, the growers of the region were almost desperate. Very few had broken even; many of them had to pay the rail and storage charges on their fruit out of their own pockets, for prices did not rise and the storage service was unusually poor that season. Discontent was abroad, and it was a generally conceded fact that the time was ripe for a last attempt to find a remedy or else the industry was doomed to failure. The only certainty was that no one would carry on in the same manner as the growers had done for several seasons past. So they set to work to solve their most pressing need.

Growers Get Busy

"Let George do it. I haven't time," is the phrase that spills lots of cooperative beans. The growers of the community were convinced by that time that they must have a local storage, but no one had the courage to start the movement. It was obvious that it should be erected and ready for use in the coming season if it were to be built at all. For some weeks 'storage' was the topic of conversation, but 'George' did not even make a move

(Continued on page 48.)



Fruit growers delivering apples to their co-operative cold storage plant at Marionville, Mo.



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We do not sell "cheap goods." We sell good goods. Our prices are low—but they are not price baits. We never sacrifice quality—serviceability—to make a low price.

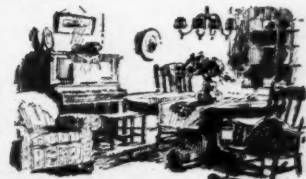
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You buy something every week. This book, therefore, offers you a saving every week. Before you buy, look through your Catalogue—compare prices. Remember our Guarantee of Quality. Remember our Guarantee of Satisfaction—"Your money back if anything does not please you."

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FOR WOMEN AND MISSES: New York is the home of Fashion. Therefore, Ward's Fashion Experts live in New York to select all of the latest styles for you. And when you buy your clothes at Ward's you get the newest, most beautiful styles without paying the usual "Fashion Profits."



HOME FURNISHING: It is a delightful task to select from Ward's Catalogue. Experts on beautiful home, artists in the selection of furnishings choose everything for this big Catalogue. And the saving you make enables you to buy many more things than you expect.



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FOR THE HOUSE: Roofing, fencing, poultry supplies, plumbing, electric lighting, furnaces, stoves, and the most wonderful bargains in furniture, yes, even to doors and mill work and the house itself. All can be bought at Ward's with certain satisfaction and at a big saving.



FOR THE AUTOMOBILE: Riverside Over-size Cord Tires, guaranteed for 20,000 miles and lasting longer than that, will save you one-third. Why pay more? The same saving is offered on tubes, batteries, radiators—everything for the automobile of standard make and quality, and with a big saving for you.



FOR THE FARM: For fifty-one years we have studied the farmer's needs. For fifty-one years we have been friends with the American farmer. We have experts in every branch of farm work to study what lasts longest, what gives the best satisfaction in actual use. Quality first for the Farmer is our policy, but always we offer a saving.

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Established 1872

The Oldest Mail Order House is Today the Most Progressive

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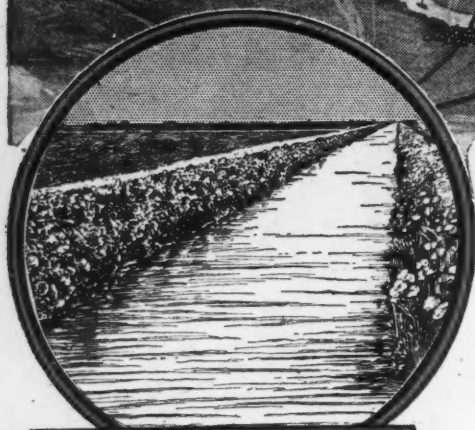
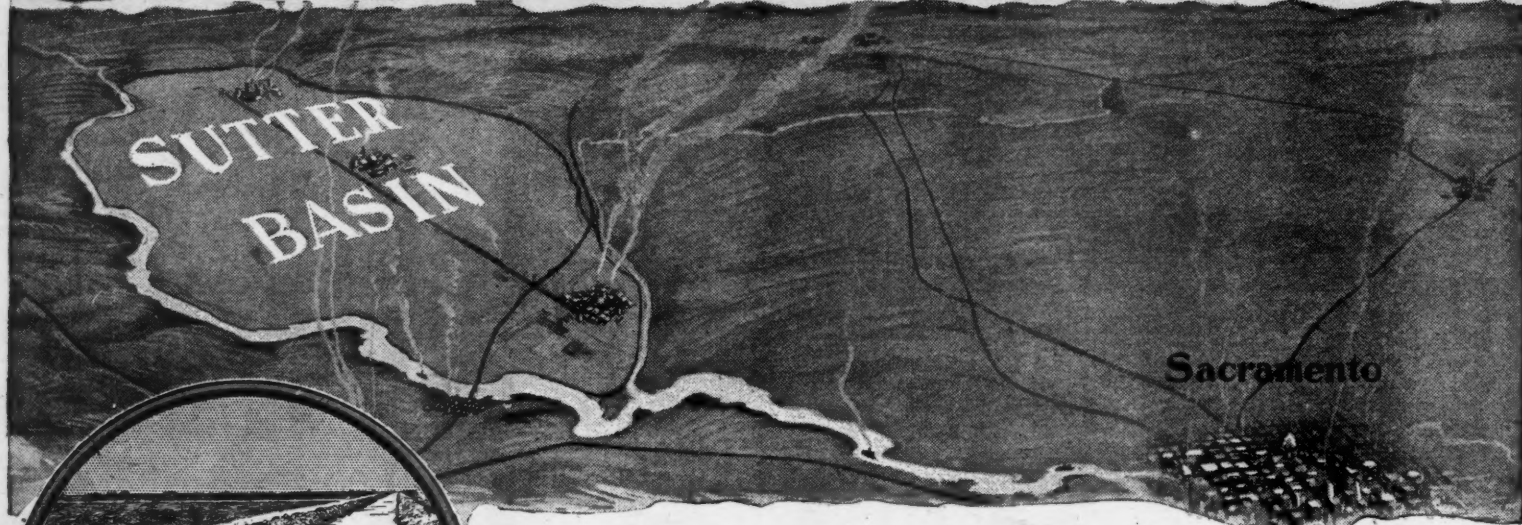
ST. PAUL

PORTLAND, ORE.

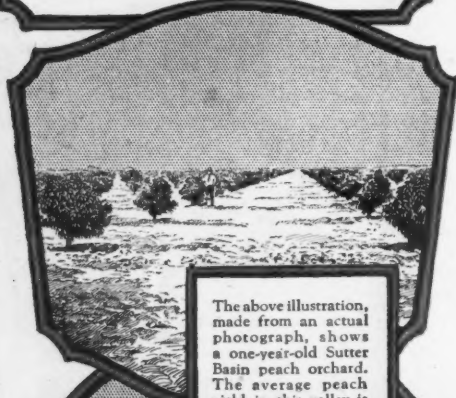
FT. WORTH

OAKLAND, CAL.

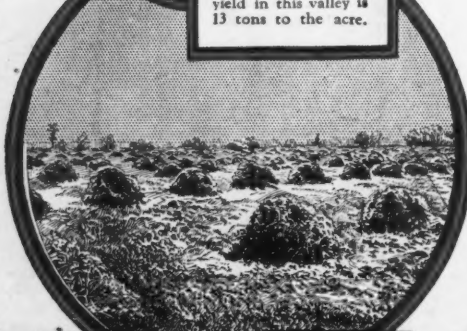
CALIFORNIA



45 miles of main canals and 137 miles of laterals carry water to all parts of Sutter Basin, as needed, assuring the greatest yields per acre.



The above illustration, made from an actual photograph, shows a one-year-old Sutter Basin peach orchard. The average peach yield in this valley is 13 tons to the acre.



9 to 10 tons of alfalfa per acre, with 5 and 6 cuttings a year, keeps the livestock well provided for, with enough left over to sell at a good profit.

A better fruitland—a better homeland

THERE'S new land waiting for you in Sutter Basin, California—fruit land second to none! A tract consisting of 45,000 acres of wonderfully fertile, easily tilled river-bottom land is being divided into suitable farms, which are being sold to desirable farmers—not speculators.

Here fruits of all kinds thrive. Rich soil, balmy climate, abundant sunshine, and controlled moisture combine to produce the greatest yields per acre of all crops. Sutter County is the home of the famous Thompson Seedless Grape and is a heavy producer of many varieties of fruits, including: peaches, prunes, grapes, plums, pears, apricots, cherries, figs, olives, pomegranates, apples, almonds, walnuts, etc. The peach yield averages 13 tons to the acre but runs as high as 22 tons in some cases.

Complete Irrigation System

A complete irrigation system is already in operation and supplies ample water to all parts of the tract. One share of water company stock goes with each acre of land so that Sutter Basin farmers own their water as well as their land. There is also an excellent drainage system for carrying off surplus moisture in sections where needed.

Markets and Transportation

Convenient canneries and the city markets of Sacramento, 22 miles away, San Francisco, 100 miles distant, Oakland, and all Pacific ports provide ready outlets for Sutter Basin produce of all kinds. Railroad transportation the entire length of the Basin, with townships at both ends and in the center, cheap water transportation on the Sacramento river, and concrete highways enable Sutter Basin farmers to reach the best markets at the lowest cost.

California At Its Best

California is at its best in Sutter Basin—both in the matter of climate and healthfulness. U. S. Weather Bureau records show a variation of only 27 degrees in mean temperature between the months of January and July, at Sacramento, and records of the State Department of Health show a lower death rate in this valley than in any of the five great divisions of the State.

Schools, churches, social and business centers within the Basin as well as outside of it, combine to make life attractive here—and scattered throughout the State are many of the country's most marvelous scenic wonder spots—right at your back door!

Get all the facts about this better fruit land—and better homeland. Fill out and mail the coupon for complete information.

SUTTER BASIN COMPANY—Eastern Sales Department

345 TRANSPORTATION BLDG., 608 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS

HOME OFFICE—SACRAMENTO, CALIF.

This project has been submitted to the Real Estate Commissioner of the State of California and the title, water, and methods of sale have been approved by him.

Mail
Now

SUTTER BASIN

Sutter Basin Company, Eastern Sales Dept.,
345 Transportation Bldg., 608 So. Dearborn St., Chicago, Ill.

Without obligation, please send me full information regarding Sutter Basin Lands. I am interested in (state kind of farming you would like to follow in California):

Name _____

R. F. D. _____ Town _____ State _____

Thinning Deciduous Fruits

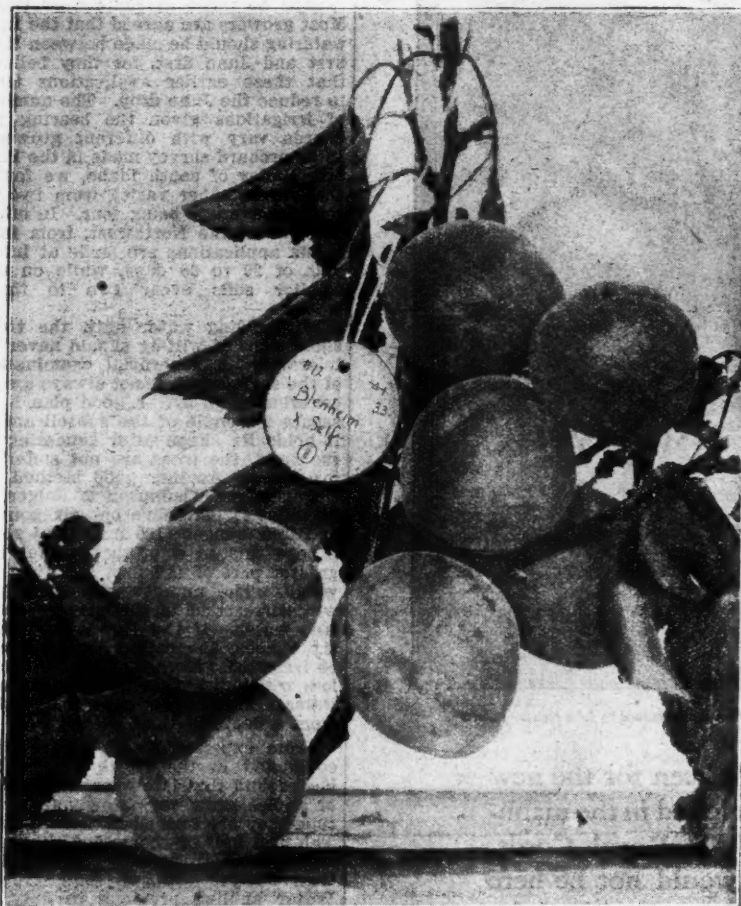
(Continued from page 8.)

germinate spores of the brown rot. This disease spreads very quickly from fruit to fruit at ripening time, by contact, and within two or three days the entire cluster may be infected.

Thinning apricots on trees which have been pruned by the so-called "long system" requires special mention. Such trees ordinarily set a much heavier crop than "short pruned" trees of similar age and therefore require heavier thinning. In

thinning and is the one fruit which under practically all conditions must be thinned. It has been shown that it takes two two-inch peaches to equal in "green" weight one two-and-a-half-inch peach, and also that when the dried fruit is considered, it takes three and three-quarter standard grade Muirs to equal one extra fancy dried Muir. These facts emphasize the importance of securing size.

The common recommendation has been to thin peaches so that the fruits are separated by four to six inches at ripening. However, if two fruits are on opposite sides of a shoot and are



Fruits composing this cluster of apricots would have reached better size had one or two specimens been removed at thinning.

some sections, apricot trees set fruit on the slender one-year shoots which, if left, is very likely to produce small, scarred and "fog-marked" specimens. These should all be removed and this is most easily and cheaply accomplished by means of a light pole, to the end of which has been fastened 12 or 14 inches of old rubber hose. The branches may be struck with this hose to knock off the apricots at thinning time without material injury to either branch or buds.

far removed from other specimens both may be left. It is probably impractical in most cases to attempt to separate "doubles." Remove all such if there are enough "singles" to make a crop.

Recently Weldon² has submitted figures, collected by the Southern California Canners' Bureau and the California Growers' Ass'n, showing the number of peaches of different sizes necessary to make a ton of fresh fruit. From these facts, the author

TABLE 2.—THINNING SCHEDULE.

Number of tons per acre desired.	20 feet by 20 feet.		24 feet by 24 feet.	
	108 trees per acre.	75 trees per acre.	108 trees per acre.	75 trees per acre.
Tons.	2 1/2 in.	2 1/2 in.	2 1/2 in.	2 1/2 in.
1.....	104	70	104	70
2.....	208	140	208	140
3.....	312	210	312	210
4.....	416	280	416	280
5.....	520	350	520	350
6.....	624	420	624	420
7.....	728	490	728	490
8.....	832	560	832	560
9.....	936	630	936	630
10.....	1,040	700	1,040	700

Considerable experience is necessary to determine how heavy the set must be to make a systematic thinning of the apricot orchard economical. Observations seem to indicate that crops up to a certain tonnage will be brought through to maturity with marketable sizes without carefully breaking up every cluster and separating adjacent fruits as above recommended. Nevertheless, conservative apricot growers make thinning one of the annual orchard operations.

Peach.—The peach responds most readily of all the deciduous fruits to

calculates the number of peaches of a given size which must be left on a single tree planted at a certain distance to produce a given tonnage per acre.

The orchardist can only after long years of experience accurately estimate the tonnage trees of a certain age and condition should produce. Reducing the number of peaches on a tree to a given number will not as-

²Geo. P. Weldon, A New Idea in Peach Thinning. Bull. No. 5, Feb., 1923, Chaffey Junior College, Ontario, Calif.

(Concluded on page 16.)

Valuable news in a simple statement

There is actual news for the farmer in the statement that now "it costs no more to buy a Kelly."

For many years, Kelly-Springfield tires were sold at a higher price than the best of the "standard" tires but those who wanted the best at any price bought Kellys.

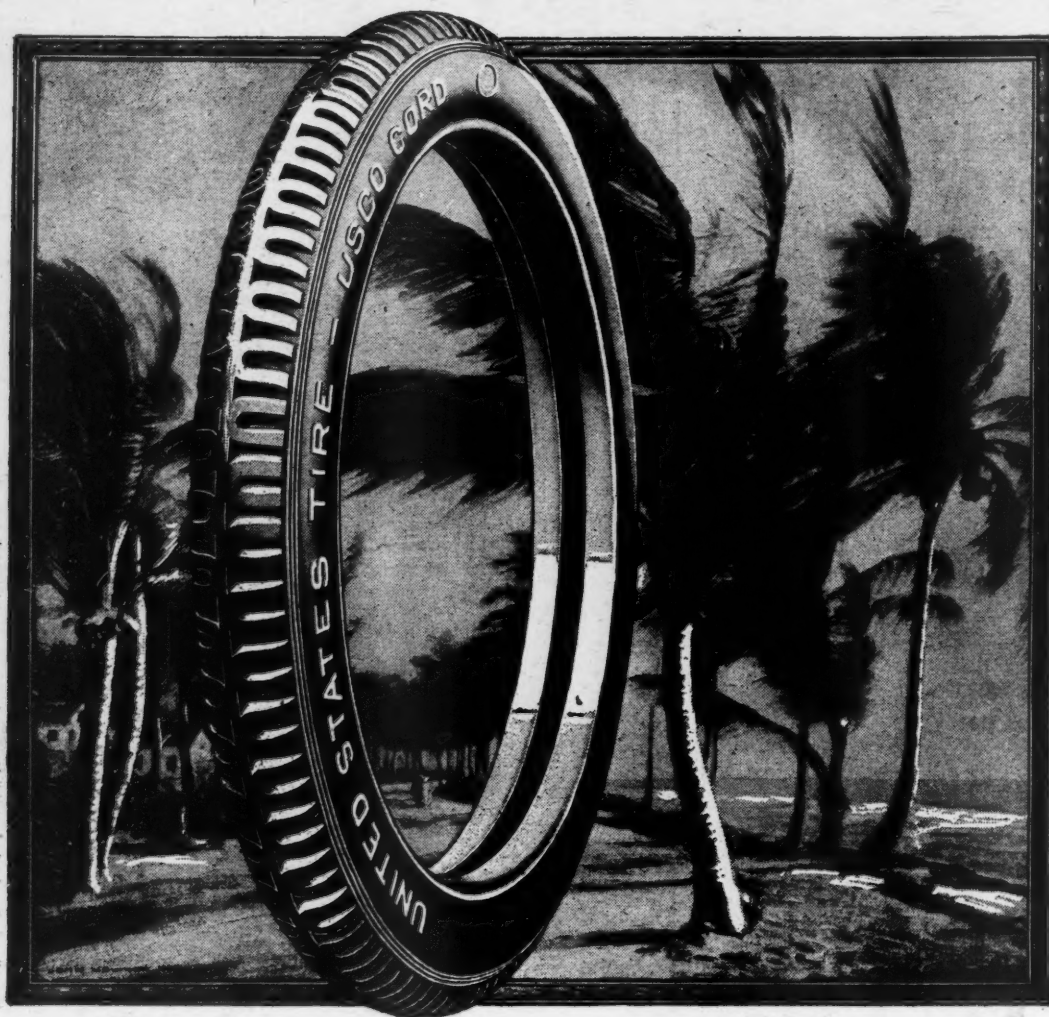
Living up to traditions, never cheapening the product to meet competition, the business grew until a great new plant—one of the world's biggest and best tire factories—was built.

In this plant the Kelly-Springfield quality has been further improved and the cost of production greatly lessened.

It is as important news to the farmer as to the city man, that he may now secure the greater mileage, the additional sure-footedness, and the priceless peace of mind that Kelly tires afford, at the same price he would have to pay for an ordinary tire.

It costs no more to buy a Kelly

KELLY-SPRINGFIELD TIRES



© U. S. Rubber Co., 1924

Scene at Palm Beach painted by John Newton Howser

It is only a matter of months since such a tire as the Usco Cord was more than any man expected.

There wasn't a tire anywhere that forecast the possibility of the Usco Cord.

Today Usco Cord is turning in such a consistent dollar value for dollar invested that it changes the tire user's whole scale of reckoning.

If it hadn't been for the new methods developed in the manufacture of U. S. Royal Cords, Usco Cords would not be here now to set a new standard for low-priced tire equipment.

Usco Cords are made in 30 x 3 inch and 30 x 3½ inch clincher for light cars, and in straight-side in all standard passenger car sizes from 30 x 3½ inch up.



Trade Mark

United States Rubber Company

USCO CORD

HETZEL'S ELASTIC TREE CEMENT

Used for
SEALING, GRAFTING,
PRUNING AND BUDDING
TREES



NON-POISONOUS, NON-
PENETRATING
HAS NO EQUAL

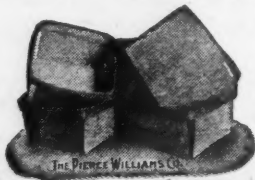
Made in Red, Black, Brown
and Gray Colors
5 pound can.....\$2.50
1 pound can......60
Prepaid in U. S.
State color desired.

Estate J. G. HETZEL
Newark, New Jersey
ESTABLISHED 1868

DESTROY FIELD MICE

If your garden or orchard is infested with field mice write us and we will send you a free booklet telling how to destroy them without the use of traps or virulent poisons.

PARKE, DAVIS & CO.
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DETROIT, MICH.



Baskets for Apples, Peaches, Plums, Grapes, Tomatoes, Cucumbers, Beans, etc. Boxes and Crates for Berries, Cucumbers, Celery, Cauliflower and vegetables of all kinds.

PLANT BOXES
Catalog mailed on request
The Pierce-Williams Co. South Haven, Mich.
Jonesboro, Ark.

Irrigation Practices in the Northwest

(Continued from page 4.)

crops such as alfalfa should not be grown. Where clean cultivation is practiced in the bearing orchard, it has been found that from one and five-tenths to two acre feet of water per acre is sufficient to mature a crop of apples, providing a good dust mulch has been maintained.

In the development of a crop of apples, it is important that the applications be made at the proper time. Most growers are agreed that the first watering should be made between May first and June first, for they believe that these earlier applications tend to reduce the June drop. The number of irrigations given the bearing orchards vary with different growers. In an orchard survey made in the Payette Valley of south Idaho, we found that this number varied from two to ten, the average being four. In other sections of the Northwest, from four to six applications are made at intervals of 20 to 30 days, while on the sandier soils every two to three weeks.

Withholding water until the trees show signs of wilting should never be tolerated. A superficial examination of the surface soil is not always a safe criterion to go by. A good plan is to secure a sample of the subsoil and if it holds its shape after squeezing in the hand, the trees are not suffering for water. Another good method, as suggested by Thompson & Folger, is as follows: Measure out six pounds and four ounces (100 ounces of soil), expose this to a bright sun for the greater part of the day, and then reweigh. The number of ounces lost will correspond to the percentage of free water. If the loss is less than six ounces, the soil probably should be irrigated. More than a 10 per cent loss will indicate a superabundance of water. The sample should be taken from a depth of three feet.

From experiments that have been conducted in the Northwest, it has been found that late keeping varieties of apples grow very slowly from the time they are formed until early July. The first half of the period the fruits hang on the trees, they complete less than 30 per cent of their growth. Water applied previous to July 15, will not materially increase the size of the apples. During the later part of the fruit developing period, from July 15 or until about two weeks before harvest, the trees should receive plenty of water. Light irrigations, applied early in the season, followed with liberal applications during the period of most rapid apple growth, will give the largest percentage of extra fancy, and fancy apples. It is evident that an even amount of water increasing in amount as the season advances, will give the best results in the bearing orchard.

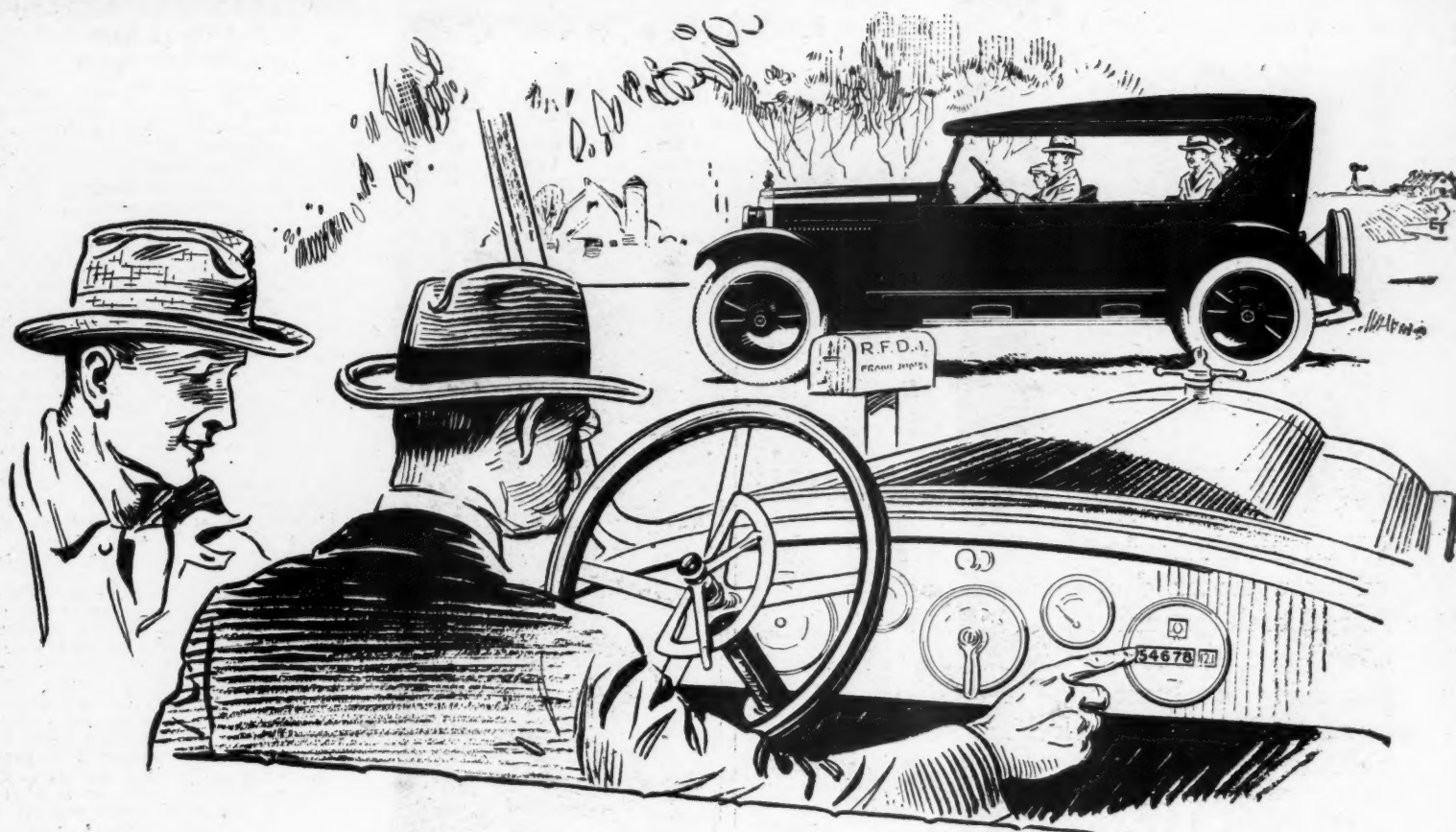
A good plan to follow in the light of the above investigations would be:

- The first irrigation, a light one, about June 1.
- The second irrigation, a light one, about July 1.
- The third irrigation, a heavy one, about August 1.
- The fourth irrigation, a heavy one about two or three weeks before harvest.

A. F. B. F. Making a Study of Co-operative Methods

THE AMERICAN Farm Bureau Federation is making an extensive survey of the methods of organization and operation used by various co-operatives of the country. Contracts and by-laws are being collected. These will be studied point by point to the end that a summary may be made showing the principles which are embodied in the plans of organization and operation of successful co-operatives of the country.

This survey, when completed, should be of a lot of value both to existing co-operatives and to leaders who are planning new ones.



Mileage that Makes the Map Seem Small!

When automobile owners grow tired of trading in their old cars and buying new ones every so often—and make up their minds finally to own a car they can keep year after year—you find them turning to the Knight.

Seasons of use only *season* the beautiful Willys-Knight. The longer you drive it the more you are proud of it. The wonderful Willys-Knight sleeve-valve engine is smooth as velvet—quiet as a ghost—and it *actually improves with use!* No noisy cams. No

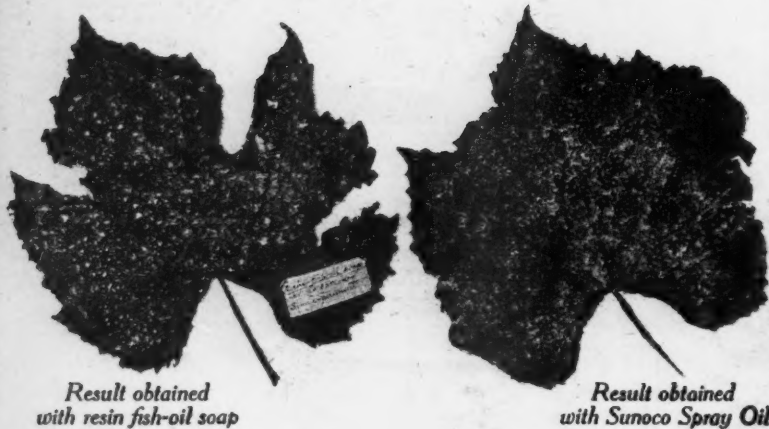
valve-grinding. No bother from carbon. Welcome freedom from the common woes of ordinary poppet-valve engines.

Willys-Knight owners report 50,000 miles and more without ever a mechanic tinkering with the engine. You may never want to drive all over the map, as some Willys-Knight owners do—but it is a mighty big satisfaction to own a car with the type of engine that has never been known to wear out. And certainly a wonderful investment!

Willys-Knight Models: 2-pass. Roadster \$1175; 5-pass. Touring \$1195; 7-pass. Touring \$1325; 5-pass. Coupe-Sedan (Standard) \$1450; 5-pass. Coupe-Sedan (De Luxe) \$1550; 5-pass. Sedan (Standard) \$1695; 5-pass. Sedan (De Luxe) \$1895; 7-pass. Sedan \$1995; f. o. b. Toledo. We reserve the right to change prices and specifications without notice.

Willys-Overland, Inc., Toledo, Ohio • Willys-Overland Sales Co. Ltd., Toronto, Canada

WILLYS-KNIGHT



Add to your profits on fruit

When you use Bordeaux or Lead Arsenate with a spreader, drops should not form and fall to the ground. Instead, the spreader should coat leaves and fruit with an even protective film. Insects and fungi will then have no chance to attack the plant, foliage or fruit.

SUNOCO SELF EMULSIFYING SPRAY OIL

often adds 50% to the effectiveness of sprays. It carries the protective materials to every crack and crevice on branch and twig, killing young crawling scale, mites and aphids.

Sunoco possesses extreme "oiliness," mixes with water and insecticides readily and stays mixed; will not separate in the tank or on the tree. It is easy and safe to handle.

You will find Sunoco a most satisfying and efficient spreader and sticker; better yet, the cost is low especially if you compare your costs with your profits.

In the Erie grape belt Sunoco as a sticker for Bordeaux and Lead Arsenate has accomplished exceptional results.

Write for our booklet "Simplified Spraying." Use coupon.

SUN OIL COMPANY Philadelphia

SUN OIL COMPANY, Limited, Montreal

Cut out this coupon and mail it today

Please send me full information on Sunoco Spray Oil, with prices.

Name

Address

SUN OIL CO., Philadelphia, Pa.

Makers of
the Famous Sunoco
Motor Oils and
Greases

Thinning Deciduous Fruits Canners' Association (Continued from page 13.) Boosting Consumption of Canned Fruit

sure the grower that a given size will be reached. Age of trees, soil and moisture conditions, pest control and pruning treatment all must be taken into account when utilizing any such method as outlined above.

Pear.—Pears are not generally thinned in California. It would seem,

THE NATIONAL Canners' Ass'n conducted a vigorous campaign in support of National Canned Foods Week, which was held March 1 to 8. Numerous letters were sent out urging the use of canned foods for banquets, luncheons, parties and the like.



Ideal distribution of apricots when borne on adjacent short spurs.

however, that when conditions are not entirely ideal that the same considerations should hold with the pear as with the apple. In sections where the fruit which ripens first is shipped, it has been the common experience that the removal of the earlier maturing specimens helps materially in sizing the balance of the crop. This fact is especially true of the Bartlett variety. Very large sizes are undesirable for either shipping or canning and should be dried.

Plum and Prune.—Plums, especially those intended for "green" shipment, should always be thinned. This is particularly true of the Japanese varieties which normally fruit so abundantly. Plums should ordinarily be separated from one to three inches when fully mature. Varieties belonging to the European species will, as a rule, size better in denser clusters than will the Japanese sorts.

It has not been found economical to do any thinning of plum varieties utilized for prune making other than that accomplished at the annual pruning. There is, however, one possible exception to the statement just made, namely, the Sugar prune. As grown in certain localities, this variety must be thinned to prevent overbearing with resultant breakage of branches—the wood of the Sugar prune being exceedingly brittle—and to offset a decided tendency towards "alternate bearing."

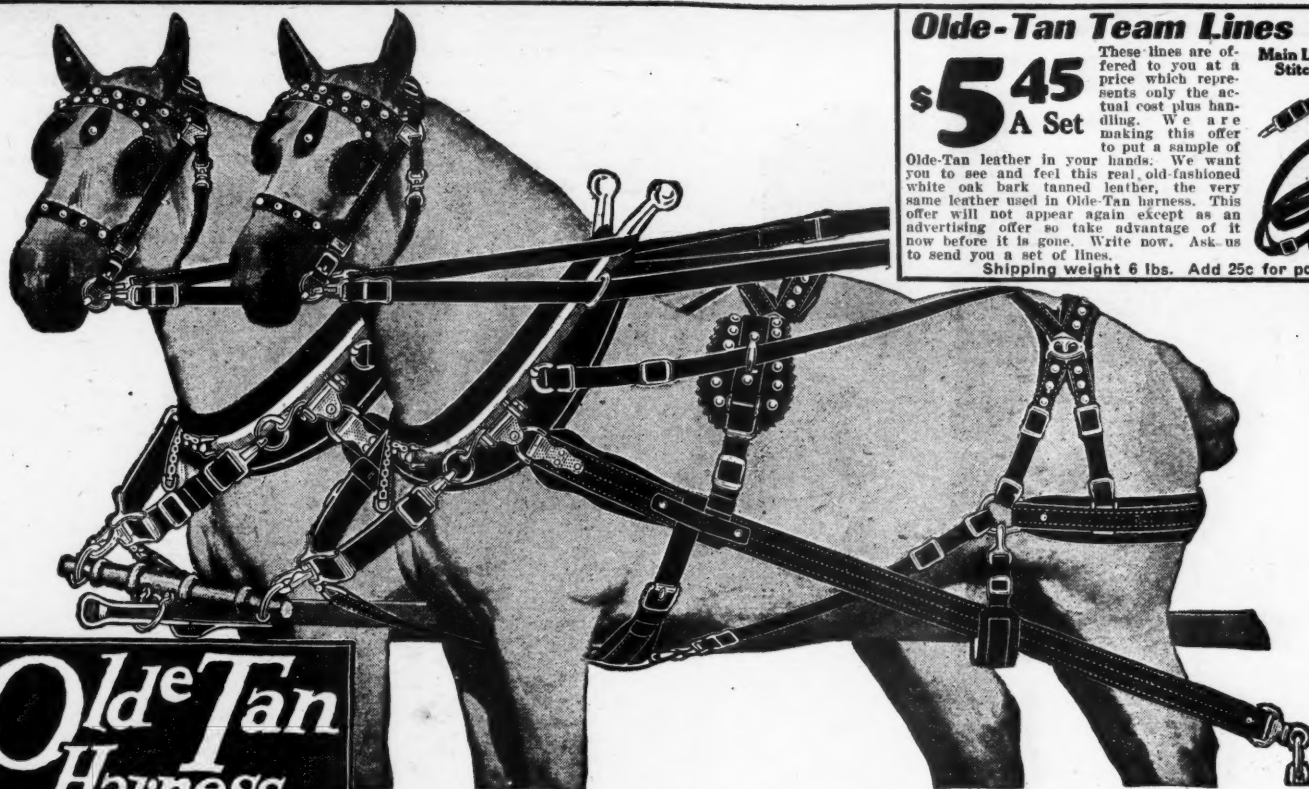
Retailers were urged to advertise canned foods for that week and were given suggestions for window displays and other local advertising.

Particular attention was given to Rotary clubs, Kiwanis and other men's clubs, many of which agreed to emphasize canned foods in their menus that week. Radio talks were given from New York, Philadelphia and other points.

This campaign, while conducted in the interest of canned foods, has an indirect bearing on the welfare of fruit growers. Much of our canned goods is fruit, and furthermore fruit comes into pretty close contact with most other canned goods. By promoting the use of canned goods, the canners' association has no doubt improved the market during the remainder of the season for fruits in storage and for the output of early fruit of the coming season.

I have been a subscriber to your magazine for many years and I think it is the best and most practical horticultural paper published on this continent.—George C. Goulding, British Columbia.

You can figure on me being a life-long subscriber to the American Fruit Grower Magazine. I think it is the greatest paper I ever saw.—J. A. Goodfellow, Ohio.



**Olde-Tan
Harness**

Olde-Tan Team Lines

20 Feet Long
1 Inch Wide

\$5.45
A Set

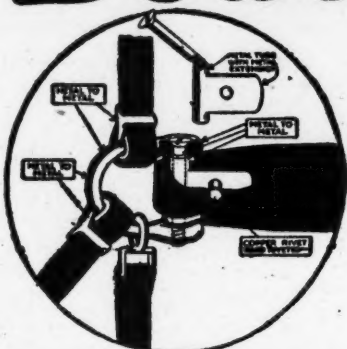
These lines are offered to you at a price which represents only the actual cost plus handling. We are making this offer to put a sample of Olde-Tan leather in your hands. We want you to see and feel this real, old-fashioned white oak bark tanned leather, the very same leather used in Olde-Tan harness. This offer will not appear again except as an advertising offer so take advantage of it now before it is gone. Write now. Ask us to send you a set of lines.

Shipping weight 6 lbs. Add 25c for postage.

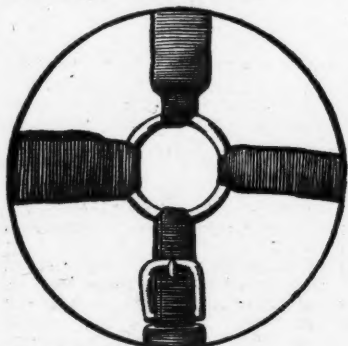
Main Line Double and
Stitched at Center



Double Wear Certain! Metal-to-Metal Does It



Metal-to-metal construction. Metal bushing. Leather held tight without play or friction. Note special riveted metal extension in breeching.



Never this in metal-to-metal construction. All pull strain and wear is on metal.



THE WORLD KNOWS WHAT
METAL TO METAL DOES
HERE

WRITE for the free Harness Book which tells you why Olde-Tan harness wears twice as long as any other high grade harness.

Every spot where there is excessive wear, strain or pull is protected by tough metal, shaped and fitted so that rounded metal parts are adjusted one against the other, thus taking away all corner pulls and sharp strains. No patching or mending of this harness because there are no places for Olde-Tan Harness to wear out. When you buy Olde-Tan Harness you do away with repair bills.

There is 70 year-old tanning skill behind Olde-Tan leather. Three generations of tanner-manufacturers have supervised the production of Olde-Tan Harness, following every step through the tannery and harness factory until the harness is ready for your horses. No wonder that it is known throughout America for its superior quality!

Olde-Tan Harness has every adjustable feature—yet few buckles are used. These are placed only where

convenience in putting on and taking off the harness is essential. No place where there is excessive strain or pull will you find a buckle on Olde-Tan harness.

You don't have to worry about your harness, if you are sure about the quality of the leather and if it has metal-to-metal construction. Olde-Tan Harness is nothing radical or "new style". We just recognize the fact that nothing wears like metal. We merely place metal against metal to make sure of longer wear. Then, in addition to that, the finest leather that can be tanned is used.

Every Olde-Tan Harness is sold under a guarantee which protects you during the entire life of the harness. Make no mistake. Find out all about Olde-Tan before you buy another set of harness. Write for the free Harness Book today. You may as well have the last word in harness—especially when it costs no more than any other harness you would buy.

\$7.50 Puts This Harness
Down On Your Horses

Write today for Free Olde-Tan Metal-to-Metal Book which tells you how for only \$7.50 down you put this Olde-Tan Metal-to-Metal harness on your horses. You will find in this book information which any man buying harness should know. The Olde-Tan Harness book tells how Olde-Tan Leather is tanned, all the different processes from

the raw hide through the liming and washing pits into the tanning drums and out again, finally to be made into what leather experts declare is the finest leather to be found in the whole world. Remember, our offer is to send you an Olde-Tan Harness absolutely no money down. After the first payment of \$7.50, you may pay the balance in easy monthly installments.

**Write—
FREE**

Ask for our free harness book. Get your copy even if you don't expect to buy harness right away. Learn about how metal-metal construction—and Olde-Tan leather have doubled the life of a harness. Learn why you should buy a tanner-manufacturer harness. Mail coupon today and free book will be sent to you at once.

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Distributors of Melotte Cream Separators and Edison Phonographs

Babson Bros., Dept. 26-03

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Please send me free your Olde-Tan Harness Book and all about your \$7.50 down and easy monthly payment offer on Olde-Tan Harness.

I am ☐ am not ☐ including \$5.70 for lines and postage.
Print name and address plainly.

My Name.....

My Address.....



Use More Nitrogen

is the advice the Horticulturist is now getting from nearly all authorities on orchard fertilization. It would seem from reading Experiment Station reports and Farm Paper articles by successful orchardists, that to grow profitable crops of apples and peaches they must have

Nitrate of Soda

2 to 10 pounds per tree early in the spring to promote healthy growth, good blossoming, the setting of fruit and largely increased yield.

My Free Bulletins give you much needed information on proper fertilizing for fruits and other crops. If you care to read them send me your address and be sure to add the number 3613.

Dr. William S. Myers, Director, CHILEAN NITRATE COMMITTEE
25 Madison Avenue, New York

STOP!

Before you spray—

Write for this special introductory offer of Red Diamond Calcium Caseinate. A 10-lb. "proof" package, sufficient for 1200 gallons of spray, will be mailed to you postpaid upon receipt of the attached coupon and \$2.00.

Because Red Diamond is a better Calcium Caseinate, we guarantee the following claims, if directions are properly followed:

60% better coverage

A saving in spray because less spray is required to cover the same acreage.

50% better adhesion

Fewer sprayings are necessary because the spray will not wash off easily in wind or rain.

25% less spoilage

Greater profits because the spray will not collect in drops, causing spot burns and discoloring.

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Name
Address

Pollination in Relation to Set of Fruit

(Continued from page 3.)

even when bloom is accompanied by favorable weather, because it is necessary for the pollen to germinate and for the pollen tube to grow the entire length of the pistil from the stigma to the point where the seed develops. Where the growth of the pollen tube is naturally slow, as in the plum, where it takes several days to make this growth under favorable conditions, cold weather following bloom greatly reduces the set, because low temperatures apparently reduce the speed of growth in the pollen tube. It would appear at first thought that this would not necessarily interfere with the set, because all processes would be affected alike and would, therefore, slow down with low temperature periods and speed up again with temperature rises. This does not appear to be the case because the drop of unfertilized pistils in the orchard indicates that there are some processes which do not wait. The limited studies on this phase of the problem centers suspicion upon the length of time which fertilization can be delayed. This is determined by the length of life of the special cells concerned.

This, in briefest form, is a statement of the manner in which adverse weather affects the set of fruits in general. It will be seen that from the beginning of winter to the last cold spell in the spring, weather must be reckoned with. Let us now consider some of the principles involved in that phase of fruit setting generally spoken of as pollination. This phase deals primarily with the effectiveness of the pollen of one variety in fertilizing its own pistils, or those of other varieties.

When a variety will not set fruit when planted alone, it is said to be self-sterile. When the pollen of one variety will not fertilize the pistils of another it is said to be cross-sterile. Two varieties neither of which will fertilize the other are spoken of as being inter-sterile. These three classes form a basis for a more detailed discussion of pollination. Let us see briefly, then, what factors enter to bring about each.

Self-Sterile Varieties.

Varieties of the different fruits may be self-sterile, and hence unfruitful for very different reasons. The pollination studies began as a result of the unfruitfulness of so many varieties when isolated. There are gradations in the degree of self-sterility as it is encountered in some instances, but in others it is absolute.

In the apple, self-sterility is encountered in varying degrees. In widely scattered tests over the country, made by different methods and under different conditions, it appears safe to assume that we have with this fruit a pollination problem to be considered carefully in orchard plantings, for it is here, or later in top working, that the remedy is applied. The tests indicate that a large number of varieties are light croppers when planted alone, but in some instances the orchard yields do not tally with the more limited bagging or greenhouse tests. However, these tests should not be disregarded because they correspond closely with the field tests in most varieties.

In many sections of the east, Rome Beauty is listed as a light cropper. Extensive tests in West Virginia indicate that this variety appears to be nearly self-sterile. It is worth noting, however, that an application of nitrate of soda in a sod orchard of trees somewhat run down increased the set materially. Likewise, in one of the fertilizer experiments of the West Virginia Station, the nitrate plots set heavy enough even though somewhat isolated.

Of the Winesap group, Stayman and Black Twig are light croppers in some orchards but not particularly so in others. Self-pollination tests show these to be practically self-sterile, and hence in need of pollination from some other variety. There is less

difficulty in getting a set, however, on Stayman than on Black Twig, although the latter is sufficiently fruitful in some orchards.

With a large number of other varieties, such as Grimes, Jonathan, Ben Davis, Delicious, Yellow Transparent, etc., there appears to be no difficulty in getting a set wherever growing conditions prevail which are favorable to fruit bud formation.

The blooming dates of varieties should serve as a guide in selecting pollinizers. The time the tree comes into bearing should also be considered. For instance, if an early bearing variety were set in alternate blocks of, say, six rows, with another variety which comes into bloom and hence bearing late, there would be a period of five or six years when the first variety to bloom would also be unfruitful, if self-sterile, because of inadequate pollination from the other.

The following list sets forth the blooming order in 1922 of some of the more important commercial varieties in West Virginia. Bloom started with April 12 with Yellow Bellflower, Grimes, Early Harvest, Duckless, Red Astrackan and Mann. The next day Black Twig and Ben Davis bloomed. On the fourteenth, Yellow Transparent, Wealthy and Alexander came in. The next group to bloom, a day later, was York, Willottwig, Winesap, Gravenstein and Stayman. Jonathan followed on the sixteenth; Northwestern on the eighteenth, and the last bloom came with Rome on the nineteenth. Full bloom was on in each variety five to eight days later. There were not more than two or three days difference in the time the different varieties came into bloom in different orchards.

The pear, like the apple, exhibits gradations in the degree of self-sterility in the different varieties. Bartlett is a light cropper unless properly pollinated, and in some of the tests, Kieffer has shown similar tendencies. These two varieties are the worst offenders of the old standards and should be interplanted. Like the apple, the pear responds to good, well-balanced culture, with reference to the set of both fruit buds and fruit.

With some of the other fruits, self-sterility is quite a different problem. In the grape and strawberry this condition is correlated with flower type. All of the grape varieties with reflexed stamens have to be cross-pollinated, and all of the strawberry varieties with the so-called "imperfect" or pistillate flowers are unfruitful if planted alone. These instances of self-sterility are too well known to warrant more detailed discussion. The proper mixing of other varieties in blocks of five to eight rows, as with the apple, is sufficient to insure a set.

The plum furnishes still another condition as to self-sterility. All of the native varieties, both of the American and Canadian plum, are self-sterile. The same is true, apparently, as far as tests have been made, of the Japanese plums. On the other hand, only about one-half of the European plums are self-sterile. This condition makes it necessary to mix plantings carefully, always, of course, selecting the best varieties as pollinizers.

The investigations on the west coast show a condition in the sweet cherry comparable to the European plum. The Oregon investigations show that such important varieties as Bing, Black Republican, Coe, Black Tartarian, Lambert, May Duke, Windsor, Napoleon and Wood are self-sterile.

There appears to be no serious problem in the outstanding sour cherry varieties.

Of the peach varieties, Hale sets light crops when isolated. The New Jersey investigations show that this variety produces poor pollen and, hence, care should be taken in planting it with others.

Passing on to the blackberry and dewberry, with these, also, self-sterile varieties are encountered. Investigations reported from North Carolina casts suspicion on a number of the most important varieties, 12 out of 16 being found to be self-sterile. Some

(Concluded on page 20.)



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It continues the well known Essex qualities of economy and reliability. It adds smoothness of performance which heretofore was exclusively Hudson's. Both cars are alike in all details that count for long satisfactory service at small operating cost.

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Kill the aphids before they have a chance to do serious damage to fruit or trees. Spray with Hall's Nicotine Sulphate. It contains 40% pure Nicotine—the deadliest aphid-poison known.

Being a vegetable extract, it does not harm blossom, fruit or foliage; but it does kill aphids every time.

A ten-pound tin makes 800 to 1100 gallons of spray. The cost is less than 2c a gallon.

When spraying for scab, codling moth, etc., mix Hall's Nicotine Sulphate with the solution and make one spray do double duty.

Buy from your dealer. If he cannot supply you, send us your order along with his name.

Note—Hall's Nicotine Sulphate is also deadly effective against thrips, red bugs, leaf hoppers, psylla and many similar insects on fruit trees and truck crops.



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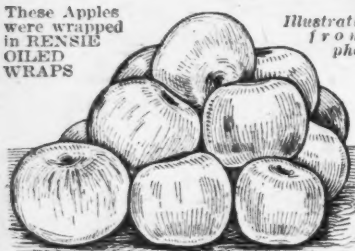
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Territory Open for Active Reputable Representatives in
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Pollination in Relation to Set of Fruit

(Continued from page 18.)

of the more important dewberries—among them *Lucetia*—were also found to be self-sterile. It will be interesting to note how general this condition in these fruits prevails. Even if there is found to be certain modifications of them in other sections, the North Carolina investigations furnish a danger signal if plantings are not properly mixed.

The raspberry varieties in the red, purple and black, do not share the defects in this respect with the other fruits.

This phase of the problem under discussion could be extended and also treated more in detail, but this will suffice to give an understanding of some of the things to be considered in new plantings.

Cross-Sterility

This condition is just as annoying and has much the same effect on the crop as self-sterility when certain combinations of varieties are planted. It will only be necessary here to give some illustrations to show the principle involved in this relationship and also to show that in general the same remedy can be applied as self-sterility. In the pollen of *Hale* is not properly formed, this variety would be ineffective either in self or cross pollination. The same would be true of the *Brighton* grape, or any pistillate strawberry variety. Cross-sterility is not always found associated with self-sterility, but that is the usual condition, and when the latter is found, the former must be looked for. The point to be kept in mind is that in all varieties where self-sterility arises from a sex condition—as with the pistillate strawberry or the reflexed stamen in the grape—such varieties cannot be used as pollinizers because cross-sterility results. Crop reduction from this source can be extensive if the proper precautions are not taken.

Inter-Sterility

This condition is only a step further than the former. It is possible to pick variety combinations which will not only be individually self-sterile but also inter-sterile, i. e., each ineffective as a pollinizer with the other. Such a condition would exist if *Brighton* and *Massasoit*, or two pistillate strawberry varieties were planted together. This condition was encountered in a very expensive form with the sweet cherry. At the Oregon station, it was found that *Bing*, *Lambert* and *Napoleon* were not only self-sterile but that they were inter-sterile, and when all three varieties were found planted together, it was necessary to provide cross-pollination for all.

Nutrition

In closing, it might be well to discuss briefly the bearing of nutrition on the general question of fruit setting. While nutrition is intimately linked up with the problems outlined above, yet some phases are apparently not within the control, commercially, of cultural practice. For instance, the flower condition in the grape and self-sterility in the plum do not appear to be within the range of influence of nutrition, although in some respects modified by it. This phase of the problem is mentioned because an attempt has been made to show that good culture and good nutritional conditions alone will not supply the key to certain types of unfruitfulness, although they do in others, as in fruit bud formation and to a certain extent the set in the apple.

A final word may be added about the different drops in fruits. These are not the same in all cases because of differences in the fruiting habits. For instance, in the plum, pistils which have not been fertilized drop; in the strawberry, a misshaped fruit results; while in the grape or currant, the cluster is affected. In general, however, there are three points in the life history of a fruit which may be regarded as turning points. First, development may be stopped in the

young flower before bloom, in which case further growth does not take place and the flower drops at bloom, or effects the shape of fruits, as in the strawberry. In the second place, development can proceed normally up to bloom and for reasons cited above, if pollination or fertilization are prevented, the young fruits drop, as in the peach, plum or apple, a few days after bloom. The next category includes the fruits which set, or in which fertilization has taken place. In these instances the young embryo aborts. This is spoken of in some fruits as the "June drop." Aside from winter killing, the disposition of all of the flowers produced which do not set and ripen can be assigned to these three categories.

A New Blackberry

By George Stomer

SEVEN years ago last August, while I was walking along an old abandoned railroad right-of-way, I noticed an unusually large blackberry bush growing near a former station called Alfred. The ripe berries with which it was loaded were extraordinarily large.

The following spring I recalled my discovery to mind, and thinking it might prove worth while, I dug the plant up from its native soil and cut the roots so as to make three plants. These roots were planted in a rich soil where they grew vigorously all summer.

The winter of 1918 was very severe in Michigan, the native state of the plants, but they withstood the heavy frosts and 14 degrees below zero. Many young plants sprung up from the roots the next spring. I transplanted these and cultivated them carefully.

After six years of diligent care I have propagated these plants to such an extent that the fruit is now being supplied to local markets at a fancy price, and it is always in good demand. The average price received per 16-quart case was three dollars. I kept a record of one-half acre of these one-year-old canes and they made a return of \$198. The canes that bore this record crop were only from 18 to 24 inches tall, while the fruiting canes for next year are from three to four feet tall, with wide spreading branches, and many canes are one inch in diameter, thus promising a much better return for next year.

Last year from this record crop I measured a good many berries that were over one and one-half inches long and three inches in circumference. Several nurserymen that have seen this half-acre patch in the fruiting season claim it to be the largest blackberry they have ever seen.

New Lines of Investigation Under Way at the Illinois Experiment Station

THE DEPARTMENT of Horticulture at the University of Illinois has taken up experimental and demonstration work in nut growing. A study is being made of the adaptation of the kinds and varieties now found in the trade, to different sections of the state. Work on breeding and the selection and propagation of promising new individuals is under way. The project is in charge of Dr. A. S. Colby, Associate Chief of Pomology. Dr. Colby believes that the opportunities for nut growing in Illinois are not generally appreciated and have not yet been properly presented in a thoroughly conservative way. He hopes that the Department may act as a clearing house for the latest authoritative information on nut culture as it relates to Illinois, and desires the co-operation of growers and other agencies to that end.

I consider the American Fruit Grower Magazine to be the best "fruit" magazine published and do not see how it could be much improved upon. I always eagerly enjoy perusing its pages.—A Much-Pleased Reader, Miss Ida V. Barr, Maryland.

Prevention of Storage Scald

(Continued from page 7)

our cool storage at Bedford, the unwrapped fruit was severely scalded by the latter part of November, but the lots wrapped in oiled paper and those packed in shredded oil paper showed no trace of scald at that time. By early January the untreated fruit was nearly all showing serious scald injury but the individually wrapped fruit was still scald free, and that packed in shredded oiled paper showed but a trace of slight scald—so slight that it probably never would have been noticed in commercial grading.

On December 4 the wraps were removed from one lot of apples to determine the effect upon late scald development. The fruit in this lot continued to remain scald free to the end of its storage season.

Another interesting and important consideration is the method of handling the fruit from the time it is harvested until it is placed in storage. Grimes were picked on two dates—September 5, at which time the fruit was quite immature, and on September 12, when the fruit was "tree ripe" and being picked commercially. The fruit picked on September 5 was left in a warm place, where it ripened rapidly. One lot of the fruit picked on September 12 was also left in a warm place, another lot picked at the same time being held in a much cooler temperature for 20 days. After October 4 the treatment of all lots was the same. None of the fruit in this series was protected by oiled paper.

By late November the fruit from the earliest picking was severely scalded and was rotting badly; by January it was almost completely consumed by the rots which had followed the scald. The "tree ripe" fruit which was kept in a warm temperature during the first 20 days was next in severity of scald injury. On the lot kept in a cool temperature and in good ventilation during the first 20 days, the amount of serious scald injury was greatly reduced, but this lot showed considerable slight scald which did not injure the appearance of the fruit to an appreciable extent.

These observations indicate the value of prompt storage in a cool, well ventilated place, but they also show that this alone cannot be depended upon to prevent scald development.

Possibilities with Shredded Oiled Paper

One of the most interesting results of these investigations is the fact that shredded oiled paper scattered through the fruit in the package has apparently controlled scald nearly as well as has the individual oiled wrapper. For the class of apples generally packed in barrels, the expense of wrapping the fruit would be too great to make it practical. If, however, the shredded paper scattered through the package will control scald as successfully as our investigations indicate, the packer of barreled apples may well rejoice. At a cost of only a few cents per barrel, both the shredded paper and the oiled paper lining for the inside of the barrel can be provided.

At the present time, the right amount of shredded paper to use per basket or barrel is not definitely known, but a sufficient quantity should be used so that some of the paper may come in contact with each apple in the package.

To Summarize: Ventilation, immediate storage or low temperatures alone cannot be depended upon to control apple scald. The use of wrappers containing 15 to 20 per cent by weight of mineral oil is an established method of scald prevention. Although not conclusively demonstrated, the use of shredded oiled paper scattered through the package, supplemented by lining the package with oiled paper, appears to be a likely method of scald prevention with barreled apples.

"Say, that's a fast-looking car you've got there. What's the most you ever got out of it?"

"Five times in a mile."—Medley.

TEN YEARS' PROGRESS

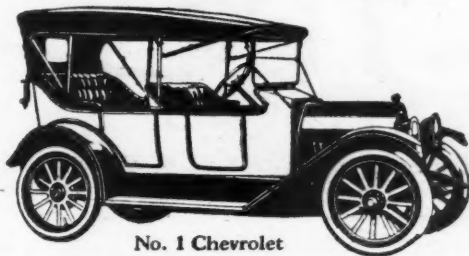
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1914

SPECIFICATIONS

Horsepower, S. A. E.	21.7
Weight	2500 lbs.
Tires, 32 x 3 1/2, fabric	(about 4000 miles)
Top	Two-man, with side supports
Gas feed	Air pressure
Windshield	Folding
Rims	Detachable
Cooling	Thermo system
Rear axle gears	Straight teeth
Oiling system	Splash
Chassis lubrication	Grease cups
Back curtain light	Celluloid
Side curtains	Stationary
Finish	Paint, air dried
Gasoline mileage	About 18
Service brake	Clutch combination
Wiring harness	Open
Insurance rating	B
Terms	Cash
Service stations	About 1000



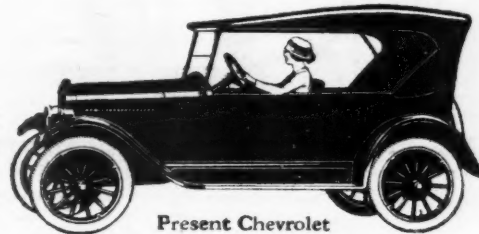
No. 1 Chevrolet

Price, 1914, \$1000

1924

SPECIFICATIONS

Horsepower, S. A. E.	21.7
Weight	1880 lbs.
Tires, 30 x 3 1/2, fabric	(about 8000 miles)
Top	(Cord tires on all closed models)
Gas feed	One man Suction
Windshield	Double ventilating
Rims	Demountable
Cooling	Pump circulation
Rear axle gears	Spiral bevel
Oiling system	Pump, forced feed
Chassis lubrication	Alumite
Back curtain light	Glass
Side curtains	Open with doors
Finish	Baked enamel
Gasoline mileage	About 24
Service brake	Separate brake pedal
Wiring harness	In conduits
Insurance rating	A
Terms	As desired
Service stations	About 20,000



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These reductions in prices have more than doubled the purchasing power of the consumer's dollar when buying a Chevrolet, although the specifications and design show marked increase in quality.

Big volume production made these economies possible. Note

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Ten Years' Record of Chevrolet Sales

1914—5,005	1919—151,019
1915—13,500	1920—155,647
1916—69,682	1921—77,627
1917—125,399	1922—242,373
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We are the world's largest manufacturers of quality cars, having attained this leadership through offering the utmost possible per dollar value in modern quality automobiles.

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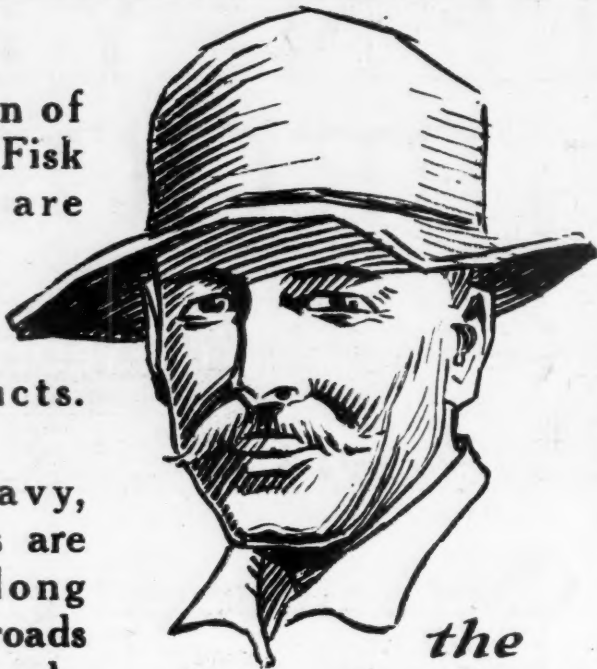
Superior Roadster	\$490
Superior Touring	495
Superior Utility Coupe	640
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Superior Sedan	795
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Superior Light Delivery	495
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These extra heavy, extra tough tires are built to give long service on poor roads and under heavy loads.



*the
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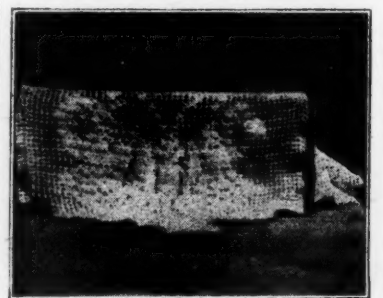
J. W. Stubenrauch Develops Exceptionally Flavored Fruit

by Jack L. Baker

DURING the past two or three hundred years, we have seen a vast improvement in our peach orchards, for in that time most, if not all, of our commercial peaches have originated. Curiously enough, this improvement has come about without very much assistance from man himself. In other words, about all he has done has been to keep his eyes open for any good variety that Mother Nature has felt called upon to bestow upon him. When a chance seedling grew to maturity, producing an excellent new peach, man has eagerly taken advantage of his opportunity and has propagated trees and planted orchards of the new sort.

In the past 20 years, there has been at least one notable example of honest effort on the part of J. W. Stubenrauch, of Mexia, Limestone County, Tex. Mr. Stubenrauch lives three miles from Mexia, on the Tehuacana road, and some very important work in actual plant breeding to obtain new peaches has been done in the Stubenrauch orchard, in fact, Mr. Stubenrauch is the originator of some of the finest peaches now produced in Texas, including 20 different varieties, and the writer recently had the pleasure of sampling a number of these promising sorts and one or two of them were just as good as they looked. Mr. Stubenrauch's orchard seldom has even a partial failure. With the extremely dry weather over an extended period in the Mexia section last year, Mr. Stubenrauch produced some excellent fruit, as the illustration shows. The four peaches laying side by side, as shown in the illustration, measure 12 inches, as the foot rule shows. The five of them weigh exactly three and three-fourths pounds. All these are yet to be named by Mr. Stubenrauch.

"I have had many specimens larger than these," said Mr. Stubenrauch. "In fact, I have two trees (seedlings), one a Freestone and the other a Cling, of which 12 specimens laid side by side measured 36 inches. These I will name Golden Chinese Cling and G. Ch. Free. My peaches ripen from the first of July up to the middle of October, one after the other through the season. These are all crossbred seedlings that came into existence on my place. These have the Northern Chinese as well as some



These five peaches weigh exactly three and three-fourths pounds. The four measure 12 inches. These are yet to be named by Mr. Stubenrauch.

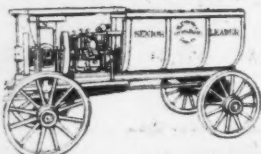
Persian and Indian blood in their makeup and this accounts for them being so well adapted to our own climatic conditions. After one of the driest seasons I have ever known here, my trees, both old and young, look today, October 15, rich and green and loaded with fruit buds for another season. Of course my orchard gets attention. My trees are trimmed, as well as sprayed. As a result, I always get satisfactory crops, as well as fruit that is sound and free from worms. Today there is more demand for good peaches than I have ever known to exist heretofore. Our people have learned that good ripe fruit means better health. I, myself, eat fruit in some shape every day the year around. I am past the 70 mark, yet I have not

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All these machines have our last word in mechanical agitators, with two stiff adjustable brushes working automatically in cleaning the station strainers—no clogged pipes or nozzles with the OSPRAYMO line. Our slogan—

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The fruit grower has been seeking a summer spray combining an effective control with safety. Now H & H—SQUARE BRAND—COLLOIDAL SULPHUR accomplishes this is told in our latest bulletin "New Developments in Pest Control," which we will send upon request.

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Three New Strawberries Originated

THREE new strawberries originated by the fruit specialists at the New York Agricultural Experiment Station at Geneva are finding favor with both amateur and commercial growers who have tried them out. These three new kinds, the Beacon, the Bliss and the Boquet, practically cover the strawberry season and have proved superior to the standard sorts grown alongside on the Station grounds. The new varieties were especially conspicuous last season because of their large size and excellent quality when most strawberries were decidedly inferior, due to an unfavorable season. The fruit sold at a premium on the local market.

The Beacon is described as the best early strawberry on the Station grounds. Boquet, which ripens about half way between Beacon and Bliss, has large, light red berries of sweet, rich flavor, which ship and keep exceptionally well. Bliss is a late mid-season variety, which stands especially high among commercial varieties because of its ability to yield well under adverse weather conditions. All three of the new varieties are believed to be worth a trial.

These new strawberries, as in the case of all the new fruits developed by the Station specialists, are being distributed by the New York State Fruit Testing Co-operative Ass'n, with headquarters at Geneva.

Subscribe to the American Fruit Grower Magazine—3 years for \$1.00.

found it necessary to take any medicine in over 20 years."

The 20 different varieties developed by Mr. Stubenrauch are suitable for planting in most sections of the southwest and all are of excellent quality. His trees are set 24 feet apart each way and the branches touch between the rows. The trees are healthy and of great capacity, and good for many years of life. The orchard is kept clean and well cultivated the early part of the season. After July 10, grass, etc., are allowed to grow to hold leaves as they fall from the trees later on.

In conclusion, Mr. Stubenrauch said: "I do not claim to be the only person capable of raising fine peaches. My contention for years has been, and is, that any person willing to devote the proper amount of time to an orchard and give the trees the right kind of treatment can do as well."

I asked Mr. Stubenrauch what his choice of an ideal location for planting an orchard would be, governed entirely by practical considerations, to which he replied:

"Sentiment," said Mr. Stubenrauch, "would play absolutely no role in it. I would select a region where I know the soil was a soil adapted to that purpose; where I knew the climate was suitable; where water and air drainage were conducive to crop insurance; where rainfall was abundant, and last, but by all means, not least, I would select a region that had demonstrated its ability to produce fruit of first quality, in addition to ample markets which could be reached without dividing my income on a 50-50 basis with railroads in return for their hauling my crop clear across the country."

Artificial Dehydration to Save Apricots

by Lillian B. Martin

ACCORDING to a successful experiment made by an orchardist in Sunnyvale, Santa Clara County, Calif., artificially dehydrated apricots will eliminate the repetition of the financial distress suffered by apricot growers during past years. It is claimed that the perfection of a whole artificially dehydrated apricot will surpass any dried or canned product because of the retention of sugar content and flavor, its cleanliness and absence of tendency to turn black during drying.

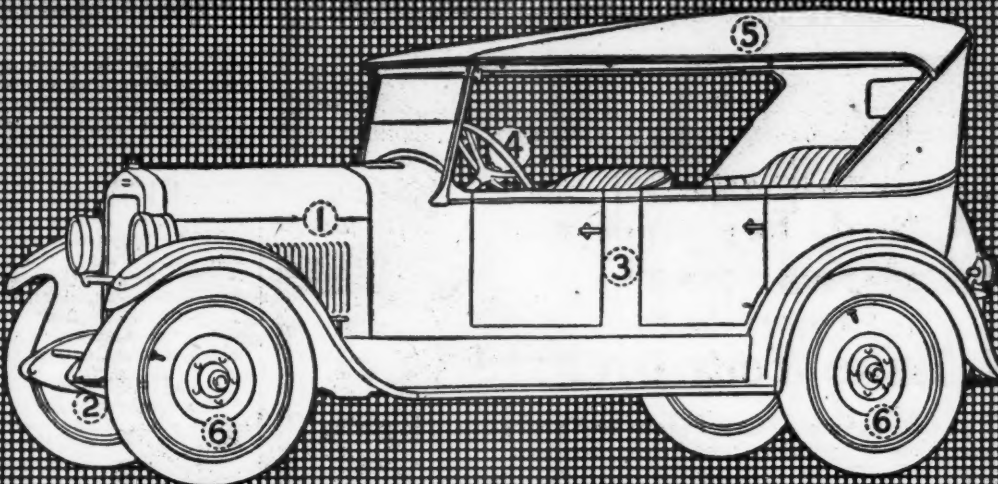
The process consists of spreading the whole apricots on trays and placing them in a drying room where the air is blown across the fruit by powerful fans for 15 to 20 hours. The fruit is allowed to ripen before drying. With this method, the apricot will retain its color and flavor and after six or seven months is as good as when picked from the tree. This successful experiment was made after considerable loss of fruit by the Sunnyvale orchardist, and the remarkable results are causing marked enthusiasm. The product has been exhibited to and used by hotel men, wholesalers, brokers, cannerymen and housewives, and directors and instructors of home economics classes have given their endorsement.

It has also been pointed out that the results of this product will also solve the labor problem. Shrinkage is three to one instead of five to one as it is when the pits are removed, and dehydration takes only 24 hours at a cost of only \$12 per ton, if hired. It is claimed that the fruit can be sold at a reasonable price to the consumer, with a fair return to the grower.

It is stated that the experiment was made largely for the purpose of stabilizing the dried apricot market and for increased consumption so that growers would not be forced to endure losses such as were experienced in the past.

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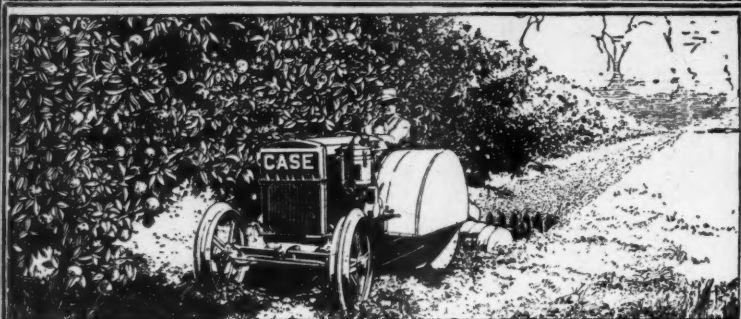
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Write for Prices and Booklets

The Non-Setting and Shelling of Grapes

(Continued from page 10.)

run up to as high as 50 per cent of the crop in susceptible varieties. If rainy weather prevails during the blooming period and black-rot is present in the vineyard, this disease may cause a blight of the blossom clusters, in which the lower end at first becomes discolored and rotten and finally the entire flower cluster turns brown and falls off. Blossom blight caused by the black-rot fungus often results in severe losses within a very few days. After the blossom clusters have dropped, the abscission scars left opposite the tendrils afford the only evidence that the shoots bloomed.

The Shelling of Grapes

The dropping of more or less fully developed grapes from the bunches shortly before maturity has troubled many grape growers in certain parts of the United States for at least half a century. This trouble, which is commonly termed "shelling" or "rattles," and which may also be termed late coulure, has been reported especially from Connecticut, Michigan, central and western New York and Pennsylvania. In severe cases, it may cause a loss of as high as 50 per cent of the crop.

Causes of Shelling

This trouble likewise is due to a variety of causes, most of which come under the category of unbalanced nutrition and unfavorable climatic conditions.

The agencies that contribute to shelling from these causes generally are considered to be the following: a weakening of the vines due to overbearing, heavy vegetative growth in proportion to the root system, attack of the vine by root-rot, or to such factors as excessive nitrogen supply emphasized by overfertilization and prolonged drought or excessive rains followed by drought. It has also been held that a lack of potash is the primary cause in many cases, although there is considerable evidence that this is not a factor.

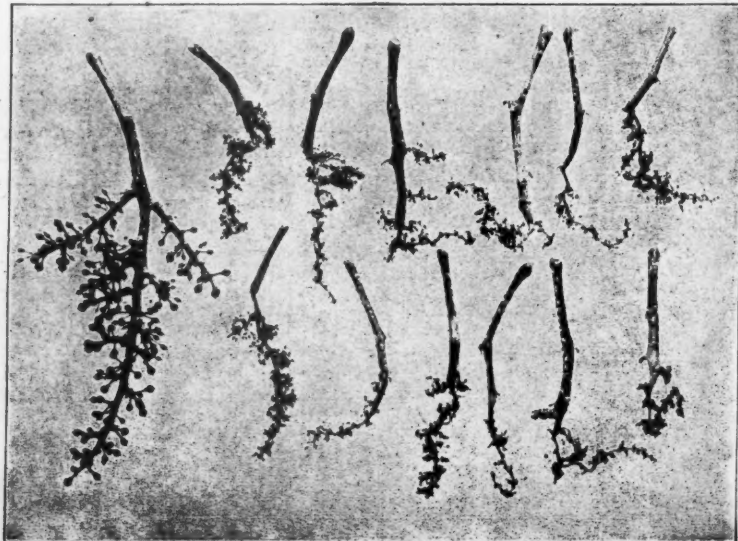
Grapes affected with shelling from purely physiological derangements engendered by these causes, usually fall two or three weeks before maturity, the normally fibrous connecting tissue of the pedicel cleaving smoothly at the point of junction with the berry. The berries at the end or at the extremity of the shoulder of the cluster, as a rule, are the first to fall. The affected berries, particularly of the green varieties, often exhibit a peculiar, though indistinct, mottling of the surface; the skin becomes abnormally thick and the whole berry is harder than normal berries of the same age. The interior of such a berry shows a brown zone immediately beneath the skin and the taste is noticeably insipid as compared to the tart, astringent flavor of the normal, unripe berries.

The shelling of mature or nearly mature grapes also may occur as the result of certain fungous diseases of the fruit, although these have been denied as the primary cause of this trouble as understood in American literature. This has been due to the fact that the term shelling has been limited hitherto to the dropping of the fruit as a result of purely physiological disorders. A typical shelling of the fruit, however, occurs when the berries are attacked by such fungi as the brown-rot form of the downy mildew, the dead-arm disease, bitter-rot, white-rot and ripe-rot. In such cases, however, the cause of the trouble usually is readily apparent, at least to the trained observer, and should not be confused with the premature separation of the immature berries from purely physiological disorders of more or less obscure origin, which was meant in the past when shelling was spoken of. Inasmuch as shelling of grapes may be caused by certain fungous diseases alone, it is evident that our usage of this term will have to be enlarged beyond the scope of miscellaneous physiological disorders, to which it has been limited previously.

Control Measures

The application of remedial measures for the prevention of non-setting of grapes obviously is futile where caused by unfavorable climatic conditions. The failure of more or less self-sterile varieties to set fruit can be overcome easily by planting near them varieties noted for their ability to produce abundant and vigorous pollen and that bloom at the same time as the variety to be pollinated. Freedom from blossom blight of the flower clusters caused by black-rot can be assured in a rainy blooming period only by keeping the vineyard practically free from this disease and by making the early spray applications recommended in the spray schedule for grapes.

In order to prevent shelling of the more or less fully matured fruit occurring as a result of purely physiological disorders, it is obvious that steps should be taken to correct any cultural conditions that tend to result in a deficient or unbalanced nutrition of the vines. The soil should receive attention and the proper fertilization which it needs should be applied. Care should be taken to properly care for the vines that have been allowed to overbear, as well as those that have been allowed to carry an excessive amount of wood; such vines require a greater food supply. Excessive cultivation, especially of poorly nourished vines, seems to aggravate shelling, probably on account of the increased amount of nitrogenous food liberated by this operation. In France the pinching off of the shoots bearing fruit after the development of from six to eight leaves beyond where the grapes are borne, or after the development of from 12 to 15 leaves on those shoots not carrying fruit, is said to give satis-



Blight of Carman grape blossom clusters caused by black rot, showing normal cluster at left—one-half natural size.

factory results in the control of shell-
ing. By this practice, the material
elaborated by the vine is carried to the
grape clusters instead of being utilized
for greater growth of the shoots.

Shelling of the nearly or fully ma-
ture fruit as a result of fungous dis-
eases attacking it shortly before or at
the time of ripening may be effectually
controlled by the late application of
some one of the fungicides leaving a
practically colorless deposit, such as
basic copper acetate or verdigris (see
article by author in the November,
1923, issue of AMERICAN FRUIT GROWER
MAGAZINE).

Money in the Blueberry Patch

by C. H. Chesley

SINCE we have been reading the
wonder stories of the new culti-
vated blueberries, we have often won-
dered if these marvels of science are
as good to the taste as the luscious
berries from our northern pastures
and bogs. Surely there is no fruit
having a more wonderful flavor than
the blueberry when it is just right for
picking. Unfortunately, its native en-
vironment is often a wet or rough
spot and difficult to be reached. There
are, however, large areas of ground
which seem particularly adapted to it
and in such places it seems to thrive
in spite of the encroachments of other
bushes and trees.

In the town of Northwood, N. H.,
there is such a patch and the owner
harvests more than a thousand dol-
lars' worth of berries yearly from it.
This land was the common birch-
grown pasture of the section and it
had been used as a permanent pas-
ture for many years. There were
many blueberry bushes scattered
among the other bushes but they did
not bear heavily, so the owner cleared
out the other brush but left the berry
bushes.

The blueberry is like other tem-
perate-zone fruits in that it has to
grow the shoots and start the buds
one season before it can blossom and
bear fruit. The first year after clear-
ing, the crop was no larger than usual
but the second showed results. Since
that time, there has been a full, an-
nual crop. The only thing that can
stand in the way of a crop every year
is a late frost, but this patch seems
to escape. It is doubtless because of
the fact that Northwood is on high
ground.

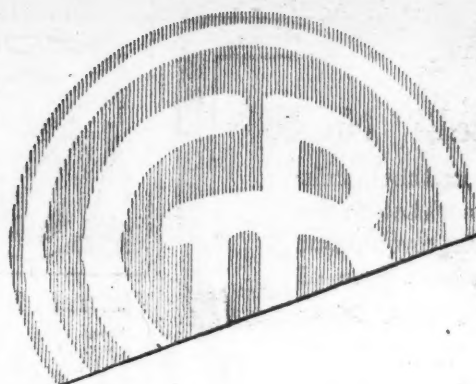
The man who has a blueberry patch
should care for it. Not much atten-
tion is needed; just cut out the bushes,
leaving the clumps of blueberry. As
the older bushes die, cut out the dead
wood or lop off the whole clump and
let new shoots start. The second
year the new bushes will begin bear-
ing. It makes little difference whether
the bush is one foot or ten feet high.
The latter height is seldom seen in
open pastures, but in the deep wood-
land bogs, where the humus and peat
of ages has been accumulated, the
blueberry is no mean shrub.

Where the low blueberry, *Vac-
cinium Pennsylvanicum*, is found, it is
a common practice to burn a section
or strip every year, and the new
bushes which come up at once will
bear for two or three years with
amazing prodigality. The tall form,
V. corymbosum, is the most important
species. It does not need renewing
like the lower species, but will bear
for many years if other bushes are
kept from over-crowding it. The lat-
ter species is the blueberry which
George Brock of Northwood makes
more money from each year than any
man in the town makes from an equal
area in farming. The entire work of
the season is concentrated into the
picking, which lasts from the middle
of July to near the end of August.

The markets are never fully sup-
plied with blueberries, else the price
would not remain around 30 cents a
box as it did last summer, hence it
seems that blueberry farming ought
to be a profitable venture. I am not
sure that it would be possible to set
bushes and make them thrive, for
there seems to be something neces-
sary, which is found only in those
moist acid soils commonly given up

as waste lands. Happily, there are
thousands of acres already planted,
but now overgrown with gray birch
and juniper, which need only a clear-
ing up to become profitable acres.

In cutting over an area where blue-
berry bushes of large size are found,
it would be well to cut the berry
bushes as well. If possible, follow
the bush-cutting with a fire, and in a
year or two, your new plantation will
begin to produce abundantly. Prob-
ably the bushes bear the best crops
when they stand four to six feet high.
This will mean a growth of five or
six years. The work of cutting the
bushes is best done during the fall
and the burning should be made in
the following spring.

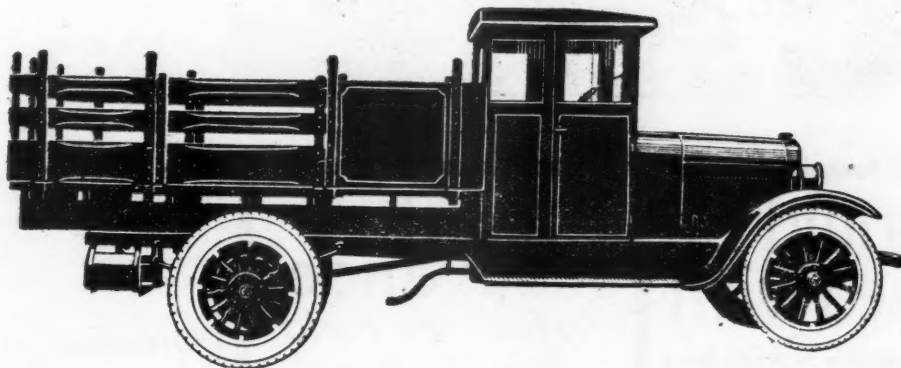


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table crops of the United States, the
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count of its recent finding that these
grapes are subject to infestation by
the Mediterranean fruit fly. This de-
cision was reached following a formal
conference with importers and all
others who were interested, conducted
by the Federal Horticultural Board of
the department January 4, 1924.—Of-
ficial Record.

No matter how rocky or rough the
ground, if it is the right type of soil,
blueberries will grow there every
year. There are no insect enemies
that do appreciable damage to the
crop, so no spraying is necessary.
The robins and wild birds take toll of
the fruit but, otherwise, the crop is
all yours and clear profit.

Brock spends his winters in the
city and comes out to the farm in
summer, hiring boys, women and girls
to do the picking while he attends to
the packing and shipping. His neigh-
bors plow and plant, fertilize and
cultivate, prune and spray, while he
just picks his berries and waits for
another crop next season.

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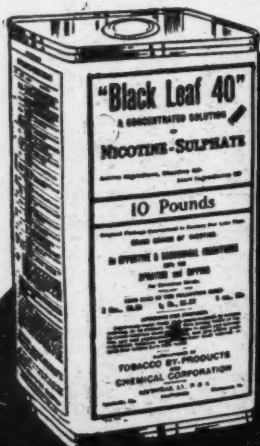
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Orchard Problems and their Solution

by Paul C. Stark
Associate Editor

Formula for Lime Sulphur

Please give me the formula for lime-sulphur. Should it be diluted for dormant spray?—A. R. S., Ohio.

THE HOME-MADE concentrated lime-sulphur corresponds exactly to the commercial solution except that it will probably be somewhat less concentrated.

As a general rule, it is advisable for the orchardist to buy his lime-sulphur from some reliable firm rather than attempt to make it himself. If large amounts are required, however, it may be cheaper to make this solution in the orchard. If this is done, only first-class materials should be used and great care taken in the process of manufacture.

A good formula for making home-made concentrated lime-sulphur is as follows: 50 pounds fresh stone lime (unslaked); 100 pounds sulphur, finely pulverized; water enough to make 50 or 60 gallons of solution at the finish. The lime is put in about 10 gallons of water in the cooking kettle and the fire started under the kettle. After slaking is well started, add the dry sulphur, dry or in the form of a thin paste, which will require about five gallons of water. Boil and stir this mixture until the sulphury scum practically disappears.

Concentrated lime-sulphur resulting from the above boiling should be diluted with water, for spraying, at a rate depending upon the concentration of the liquid. This is determined by the use of a hydrometer. The hydrometer reading of commercial lime-sulphur is usually 32 or 33 degrees Beaume, and at this strength, it is diluted one to eight for the dormant-spray. The home-made concentrated lime-sulphur will probably give a hydrometer reading of several degrees less and consequently should be diluted much less for spraying. For example, if the hydrometer reading is 28 degrees Beaume, the dilution will be one to six; if the reading is 24 degrees, dilution will be one to five; if 20 degrees Beaume, dilution will be one to three and one-half. The same solution may be made for the summer applications and diluted one to forty on the basis of 32 or 33 degrees Beaume reading.

Hardiness of Delicious Apple

Is the Delicious apple as hardy as McIntosh, and would it be a good variety for planting here in Maine, where winter temperatures often reach 40 degrees below zero?—F. A. B., Maine.

THERE is no question at the present time but that Delicious can be classed as one of the hardy varieties of apples. The variety originated on the blizzard-swept plains of Iowa where below-zero temperatures are the usual thing. In addition to this, it is an important commercial apple in the colder fruit-growing districts of Canada, Montana, New York and New England.

One grower of the Delicious in the St. Lawrence district of New York state recently expressed his belief in the hardiness of this variety when he said it was the only variety in his orchard which did not winter-kill during the severe winter of 1917-18. This is particularly significant because of the fact that in this same orchard were some trees of Wealthy, a variety originated and grown in Minnesota and noted for its hardiness.

I see no reason why Delicious cannot be considered practically as hardy as McIntosh. There is no doubt about its being adapted to Maine conditions. I know of one very successful Del-

icious orchard near Dexter, Me., a section which has had equally cold winters to those you mention. Furthermore, the Maine growers have tested the variety and claim that they can grow a high-grade Delicious that will hold up in storage until late in the spring.

Top-Working Fruit Trees

Please tell me the best time to top-work a young pear tree. When would be the best time to select buds for budding peaches, pears and cherries?—C. E. M., Illinois.

THERE are two common methods of top-working: Budding and grafting. As a general rule, apples and pears are grafted, while peaches, plums and cherries are usually budded. These operations are done at two different times of the year, however, and upon this fact rests the matter of when to select the wood or buds for top-working.

Grafting wood, commonly called "scions," is cut any time during the dormant season and held in a cool, dark storage until early spring. It may be cut at the time of grafting, if still thoroughly dormant, but it is much safer to cut them ahead of time. The grafting should be done in early spring after the sap starts to rise in the trees, but before the buds open. The ideal time is just as the buds are swelling.

Budding is done during the late summer or early fall, after most of the season's wood growth has taken place. The budwood for this work is cut as near to the time of budding as possible and the leaves cut off about one-fourth inch above each bud. After the buds are inserted and tied, they will unite but will not start to grow until spring, at which time a large portion of the old variety is removed above the bud by pruning in order to stimulate the newly set buds into growth.

Pruning Young Peach Trees

I have just received my peach trees from the nursery and am ready to plant them. Will you tell me how to prune these trees when they are set out? They are about five feet high and well branched.—W. J. M., Tennessee.

YOUNG peach trees are planted as branched yearlings, at which time all branches are removed with the exception of those selected for the head. These branches, however, instead of being left long like the apple, are pruned back to short stubs, with only one or two buds each. The tree is also headed back to 20 or 25 inches above the ground so as to form a low-headed tree.

Dwarf Pears

Will you please tell me how pear trees are dwarfed? What is your advice about the use of dwarf pears for inter-planting in an apple orchard? I have heard that dwarf pears are less subject to blight. Is this correct?—S. A. K., Michigan.

DWARF pears are produced by grafting or budding this fruit on quince roots in the nursery. The slower-growing roots of the quince result in a dwarf or slow-growing tree. This is the chief reason for the fact that dwarf pears are less subject to fire blight, since this disease is more serious where the growth of the tree is fast and, therefore, more succulent. Some growers claim that dwarf pears do not yield as well as the standard pear. Dwarf pear trees were formerly used for inter-planting between apples, and although they are superior to the standard pear for this purpose, nevertheless they are not as popular, nor as desirable, for this purpose as early-bearing varieties of

apples. I would suggest that you depend on apple or peach trees for fillers.

Spraying Peach Trees

by C. F. Greeves Carpenter

THERE has been some doubt among growers as to whether it is better to spray peach trees during the dormant season with lime sulphur or with arsenate of lead for the control of the peach twig-borer. As apricot fruit is subject to sulphur poisoning, some growers have been rather skeptical about using lime sulphur on peach trees, but if the spraying is done during the dormant season, the grower need have no fear of any injury to either the trees or fruit from the use of lime sulphur.

It may be well to state that arsenate of lead, while giving good results against the twig-borer, is practically valueless in controlling fungous diseases and it is liable to damage the foliage. Therefore, as leaf curl is nearly always present in the peach orchard, it is more economical to spray with lime sulphur, which will not only control the twig-borer and leaf curl, but mites, aphids and scale insects as well.

The application of liquid (one gallon to every 10) or dry (two pounds to every 10 gallons of water) lime sulphur may be made at any time during early spring, though, of course, it is preferable to spray before the trees are in bloom.

Peach Twig-borer

The peach twig-borer is a very common pest and the over-wintering larvae or caterpillars which have hatched from eggs laid by the parent moth during the growing season may be found under loose bark or in sheltered crotches, safely encased in a small "dug out" lined with silk. These "dug outs" may be easily observed, for the larvae push out a small funnel of frass in the process of boring. These cocoons may be found from June to the following spring and with the growth of the tree, the larvae resume active life, leaving their hibernating quarters, and boring into the young buds and shoots, causing them to die back for a distance of two to three inches. When ready to pupate they leave their small burrows, which are rarely more than two inches long, and search for a sheltered spot in which to transform to pupae. This may be in a crotch of the tree, or under loose bark, or even in the seam of the peach. Over the chosen site they spin a frail web, and in from one to two weeks the adult moth emerges. The adults measure up to one-half inch long, with a wing expanse, from the tip of one wing to the tip of the other, of one-half inch. The general color of the moths is a dark gray, which forms a very protective color with the bark of the tree.

The second brood larvae or caterpillars do not feed on the twigs but on the fruit, and the damage of this work is similar to that of the codling moth on apples.

The twig-borer also attacks almond, apricot, plum and prune trees but seems to prefer the peach.

Leaf Curl

This fungous disease causes the leaves to curl and the dropping of the foliage and fruit. It overwinters on the trees and during spring infection starts from spores beneath bud scales. The lime sulphur in the same proportions as recommended for the control of the twig-borer will be found effective.

Brown Mites

The eggs from which the young mites emerge are almost microscopic red globules. These are laid in fall and hatch, with the first warm weather in spring, into red mites which turn brown with maturity. The mites multiply rapidly and by summer are often present in sufficient numbers to do much damage for, by their feeding, they cause the foliage to assume a mottled yellow effect and such leaves usually drop prematurely. This mite can be controlled by the dormant lime sulphur spray (1-10).

Black Peach Aphid

The young are reddish yellow to brown in color and are more abundant than the full grown forms, which are shiny black in color, and measure only about an eighth of an inch in length. Winter is spent under the ground on the roots, and they first appear above ground in early spring, when they at once attack the tender new growth, seeming to prefer that which is growing near the ground. By their feeding on the sap of the leaves, buds and shoots, they devitalize them, causing a weakening and curling of the leaves and a distortion of the fruit, rendering it unfit for market, if not entirely killing it. The work above ground continues until mid-July, but during April and May, winged forms appear which migrate to other trees. After July, the aphids go underground, transferring their attention to the roots of the trees.

Control.—Dusting, when the insects first appear, with a nicotine dust containing 2.36 per cent nicotine will be found effective, but satisfactory results will follow the lime-sulphur spraying as recommended for the twig-borer and leaf curl if a tangle-foot band is placed around the base of the tree directly after the application. This will prevent any of the aphids from climbing up into the tree on their emergence from the ground.

Pernicious or San Jose Scale

The female scales measure about one-twenty-fifth of an inch in diameter and are circular, convex insects, dark at birth but turning to light gray with maturity, which occurs in spring. The young scales are born at this time and settle on all parts of the tree, foliage and fruit. By their feeding, they produce a reddish or purplish discoloration on the limbs and fruit, sometimes killing the entire tree. The fruit is quite often rendered absolutely worthless for marketing purposes.

Control.—An application of lime sulphur (1-10) during the dormant season as a driving spray will be found to give satisfactory results if the trees are thoroughly covered.

Annual Meeting of Sowega

THE SOUTHWESTERN Georgia Watermelon Growers' Ass'n, better known as Sowega, held its annual meeting at Adel, Ga., in February. After reports were received from the various officers, John F. Deegan, Sales Manager of the Federated Growers, which handled the Sowega output last season, gave an address in which he explained the plan of operation of the Federated and its program for the future. It was pointed out by Mr. Deegan that in 1923 the Sowega melons were distributed in 169 markets—one of the most extensive distributions known in the watermelon trade. Mr. Deegan is making a good impression in his work with growers and leaders and is a strong factor in the Federated Growers.

Mr. George Firor of the State College of Agriculture followed with an interesting and valuable talk on the control of diseases of watermelons, both in the field and during transit. The former officers and executives were re-elected as follows: President, J. D. Paulk; vice-presidents, C. H. Cannon and E. H. Berdick; executive committeemen, F. B. Walker, T. A. Maxwell, Fred Purvis and A. N. McCranie. Most of these have served the association from the time of organization.

The pooling plan of Sowega was changed at the annual meeting. Instead of having one general pool as formerly, the territory will be divided into three districts and pools by variety and grade for each day's shipments will be made for each.

Sowega has signed a five-year contract to market through the Federated. J. B. White, who has satisfactorily handled the sales work in the past, will again have charge of Sowega sales for the coming year.

Sowega is doing a good work and deserves the support of all growers in its territory. J. J. Parrish is manager.

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The Biggest Thing in Spraying

Use less solution, spray faster, and do a real job! That is possible with Hayes FRUIT-FOG, the result of 300 lbs. guaranteed pressure and the famous Hayes spray nozzle. FRUIT-FOG forms an atomized superspray of wonderful filtering and adhering power which gets to and kills ALL the diseases and pests which destroy your crop. You get more fruit in poor years, better fruit in good years—more profits every year!

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You can now suit your ideas of price and get the famous Hayes "Fruit-Fog" Sprayers in sizes 3½ to 16 gal. per minute capacity, with or without trucks, engines, or equipment. The smallest Hayes Sprayers have the same high pressure, long life, and corrosion proof pumps as the largest.

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Showing complete line—and get advice of spray experts on your requirements.

Distributors and Dealers in all principal cities.

HAYES PUMP & PLANTER COMPANY

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Galva, Illinois

Full line of Power Sprayers, Tractor Sprayers and Hand Sprayers.

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Please send me folder and full details. I have

trees, aged... years.

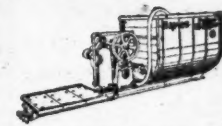
Variety.....

Name.....

Address.....

Town.....

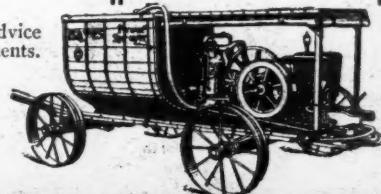
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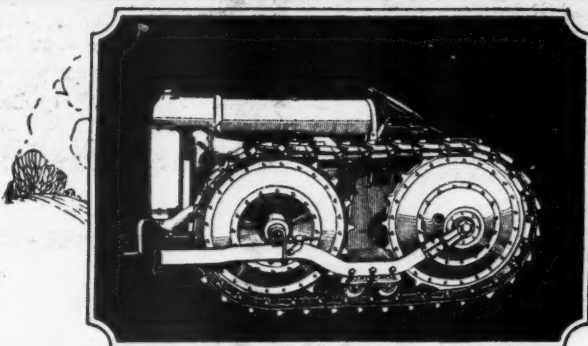
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Hayes 1903 (Below)—A 150-gallon sprayer which has made a nation-wide reputation. Send for folder, which gives complete description.



HAYES "FRUIT-FOG" SPRAYERS



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Johnson TRACKPULLS make the Fordson a super-tractor—one that will outpull and out-manuever any tractor in its class.

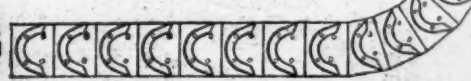
Regardless of the nature of the soil—soft, wet, or sandy; regardless of the lay of the land—rough, smooth, or hilly; and regardless of the kind of a job to be handled, the TRACKPULL-tread Fordson will do it 100% satisfactorily.

Such features as 1000 square inches of traction surface which enables the tractor to go anywhere; approximately 14 H.P. delivered at the drawbar—more power for every job; oscillating tracks which ride over rough or smooth ground with equal ease; independent clutch control which permits making a square turn under load without throwing strain on the differential; interchangeable sprockets which greatly simplify replacements and reduce repair expense—such features as these adapt the Trackpull-tread Fordson to any kind of a job, under practically any conditions, and assure the most efficient, most economical service for the longest time.

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For Better Fruit and More Money Use DRITOMIC SULPHUR

The first sulphur spray to prevent russetting of fruit with the temperature above 70° Fahrenheit, was Atomic Sulphur. Its superiority is emphasized by the constantly increasing demand.

To meet the growing demand for a fungicide in dry form, we have developed a highly concentrated material which gives fruit the valuable sulphur finish, without interfering with the functions of the foliage of the plant.

Dritomic Sulphur contains 90 per cent available sulphur, with an adhesive and spreader, which do not readily decompose, when spread in a thin film on fruit and foliage.

Being highly concentrated, only a small quantity is necessary. It is economical, easy to handle and ready to mix. Applications can be made with a lower pressure, eliminating chances of mechanical injury, saving wear and tear on pump and engine.

When used with an arsenical, the adhesive character prevents loss and gives more perfect adhesion to trees and foliage.

If you want the best results—the best fruits that will bring the best price, write for particulars.

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WITH THE CO-OPS.

UNDER this head it is the plan to report the accomplishments of the hundreds of fruit shipping associations—their successes and failures—and a discussion of organization methods, the business management of co-operatives and various other kindred problems. News items are desired and pertinent questions will be given our best thought. All such items must reach the editor, C. E. Bassett, Fennville, Mich., not later than the tenth of the month for the issue dated the following month.

THE AGRICULTURAL depression, due in part to unstable markets and low prices, has driven farmers to a study of their business problems, with the result that they look with more favor on the co-operative plan of doing business. Naturally individualists, they like to "go it alone," but they are now so sick that they are willing to take almost any kind of medicine that promises to bring relief. And there is no shortage of doctors, who for a good fee are ready to prescribe the right remedy. But the fruit growers find a real shortage of information in their possession. Our great United States Department of Agriculture at Washington, employing over 20,000 men and spending as much as \$148,000,000 in a single year, has always stressed studies of production, but given little attention to the business side of farming. Of all the 4770 projects listed by the Department in 1921, only 22 could be classed as marketing and distribution projects—less than one-half of one per cent of the total. Most of this much neglected work was in the hands of poorly paid men, who had little, if any, practical experience, and whatever their findings may have been, the information was buried in the archives of the Department, where millions of dollars of research facts and figures find a quiet resting place, so that the farmers are not much the wiser for this great expenditure made on their behalf. This is one of the glaring faults of the Department—its lack of a competent field force to "carry the message to Garcia"—to give the farmers the benefit of these studies. Few farmers read bulletins. There is a great need for a real service, to assemble the stored up information and experience and feed it to those who hunger, in palatable and digestible portions. In the absence of any help from our Government "economists," farmers are paying out hundreds of thousands of hard earned dollars to professional organizers, whose forms are so technically drawn that it is necessary to retain them perpetually, at high salaries, to enforce the terms of the contracts and keep the organization in legal health.

WHILE all organization authorities agree that a strong membership contract is desirable, as a basis of understanding, for purposes of financing, etc., there are other matters of even greater importance. Co-operative shipping associations are created by the grower members for the purpose of securing a better marketing service, not for the purpose of erecting a prison. Long time, cast iron contracts fail, where marketing service is poor. Witness any number of strong contract associations that have gone to the wall in short order. On the other hand, the American Cranberry Exchange, the California Fruit Growers' Exchange and the Eastern Shore of Virginia Produce Exchange are three of the oldest and strongest co-operative associations in

America, and they pay very little attention to members contracts. Their service is such that a grower does not want to leave. By all means, let associations pay a great deal more attention to building superior marketing machinery and save a lot of these acrimonious law suits to force a member to stay where he is losing money through poor management.

IT IS very unfortunate that this co-operative movement is getting a lot of very poor advertising through the controversies that have arisen in the Packer and other trade papers, based upon the charges made by Aaron Sapiro for legal advice in connection with organization work. These trade papers get their chief income from the advertising of speculative fruit and produce merchants and they are not very enthusiastic over the progress of farmers' co-operative selling associations. These produce trade papers have found very interesting items in the stories of extreme charges made for short time service and they have made the most of them to discredit the movement and discourage the growers.

THE OREGON Growers' Co-operative Ass'n has not turned out as well as expected. Manager Paulus has resigned, effective April 1. The growers have lost a most valuable man, but many of the producers "pass the buck" to Paulus for all the association mistakes, and it is apparent to anyone, who knows the psychology of the grower, that it would be impossible to reorganize if former officials remain at the head and so a new deal is on. Their growers' contracts expire at the end of 1924. They have discontinued handling any fruit except dried prunes for the current year and are attempting to reorganize the association under a new name, for the purpose of handling dried prunes only; the new deal to start January 1, 1925. If their plans succeed, they will take over all the dried prune processing plants and office equipment. Their new contract will be continuous, with an annual withdrawal clause. It is a common belief that they are again making a serious mistake in organizing a state-wide association, with packing houses operating all over Oregon and owned by the central agency, rather than organizing local packing and processing plants, owned locally, and then federated into a central sales agency.

THE AMERICAN Farm Bureau Federation, which announces that it "has done more to establish co-operative business organizations in America than all other forces combined," has been without a director of its marketing department ever since its annual meeting, when Walton Petet took offense because the delegates would not approve of his grain marketing program and resigned. The Federation seems to be having difficulty to find a big enough man and the funds to finance the work.

LAST year the Idaho prune growers organized an association to try and control shipments and price quotations by selling agencies, who first had to be approved by the association the previous year. The latter provision was dictated by three speculative agencies, who were let into the association because they controlled about 800 cars. The effort was more of a desire than a practical plan,

for here was an attempt to have the "lion and the lamb to lie down together" and, so far as we know, that only happens when the lamb is inside the lion. There was a big crop of fresh prunes and the results were mostly debts. Everyone who touched the deal was scorched. At the annual meeting, there was considerable sentiment for a reorganization, on a co-operative marketing basis, but the largest blocks of tonnage are held by independent operators and they could not agree with the committee appointed to work out a plan. So prune marketing in Idaho is right where it started. Perhaps one more disastrous year will bring the real co-operators together on a workable basis. But let it be remembered that speculators and co-operators make a poorly matched team to move a load.

THE WENATCHEE-Okanogan Co-operative Federation again elected Frank V. Taylor, of Sunnyslope as its president; F. H. Pippis, of Brewster, vice president; J. A. Warman, of Peshastin, general manager; executive committee, F. H. Moses, of Cashmere; O. P. Hastie, of Entiat; F. C. Paine, of Omak; and the president and general manager. Other trustees are: M. W. Starks, of Peshastin; C. M. Wild, of Chelan; I. H. Logue, of Pateros; L. E. Schmitt, of East Wenatchee; Dr. H. B. Clough, of Tonasket; and H. Windebank, of Grants Orchards.

R. D. CHATFIELD, who has been the manager of the Mosier (Oregon) Fruit Growers' Ass'n for 14 years, has been retained and the following officers re-elected: Dr. C. A. Macrum, president; Lee Evans, vice president; J. M. Carroll, secretary; Mosier Valley Bank, treasurer. J. P. Rose and C. A. Macargar are the other directors. The growers of that association unanimously endorsed the plans for a federation of sales agencies for more orderly marketing.

OFFICERS of the various grower organizations in Idaho, that have sold their fruit the past year through the Federated Fruit & Vegetable Growers, recently held a meeting at Boise. They expressed their satisfaction with the results obtained the first year and were very optimistic as to the future of their own national sales agency. Comparisons of sales with those of other sales agencies were very favorable to the Federated.

WITH sales of fruit amounting to nearly \$100,000, the Saugatuck (Michigan) Fruit Exchange has closed the best year in its history, despite the low range of the fruit markets. One hundred and fifty-eight carloads of fruit were shipped. Thor Schreiber is president; H. W. McIntosh, vice president; J. W. Prentice, secretary-treasurer; extra director, Henry Jager.

THE FENNVILLE (Michigan) Fruit Exchange enters the new year with good prospects, despite the low prices for fruit that have ruled for the last few years. It was organized in February, 1915, and owns one of the most complete packing plants in the state. Last season it sold 308 carloads of fruit and made a large number of less than carload shipments. Its "Diamond F" brand is known for its reliability and the "Star" brand is a good one for seconds. A large business is done in fruit growers supplies and investigations are now being made, with a view of erecting a large cold storage plant. Officers are: T. L. Gooding, president; D. W. Wadsworth, vice-president; Leon Shepard, treasurer; E. F. Payne, secretary and manager. Additional directors are: George B. Mechem, V. A. Kenter, Russell Knox, U. S. Crane, Frank Luplow, E. E. Paine. The management has been in the hands of J. Alden Barron until the recent annual meeting, when Mr. Barron resigned to take a well-

earned rest. The former bookkeeper, Mr. Payne, takes his place.

SOUR cherry growers of western New York have started plans for an interstate organization, to include the large districts of western Michigan and the Dorr county section of Wisconsin. Production of sour cherries has advanced so rapidly in these districts that, in heavy crop years, it is difficult to move the crops at remunerative prices. It is estimated that there are over a million sour cherry trees in western New York and the Traverse Bay section of Michigan and the Sturgeon Bay district of Wisconsin are enormous producers. A joint financing plan for increasing de-

mand by advertising is included, with full co-operation with the canners. It is also believed that a larger outlet can be developed through putting into cold storage the pitted cherries, barreled and frozen, to be sold for "fresh cherry pies." Members will pool their crops by states, but all districts will co-operate on matters of common interest. It is believed that local banks will finance the plan, advancing money on the storage goods.

THE MICHIGAN Fruit Growers, Inc., made up of 22 co-operative fruit associations, have decided to try some other marketing arrangement than the one they had last season with the Federated Fruit & Vegetable

Growers, Inc. And the change seems to be mutually agreeable, as, when the fruit growers began to find fault with the Federated's market service, the manager of the national marketing agency gave notice that it had cancelled the contract, in accordance with the right of either party to cancel at the end of any season. In the notice of cancellation, the Federated manager indicated that a part of the trouble lies in a lack of standardization. James Nicol, of South Haven, is president of the Michigan Fruit Growers and F. L. Bradford, of St. Joseph, is manager. Mr. Nicol is also chairman of the executive committee of the Federated, which puts him on both sides of the issue.

A NEW 4-PASSENGER COUPE

This car is Dodge Brothers response to a definite demand—

A high grade coupe of moderate weight and size that will seat four adult passengers in genuine comfort.

The body is an admirable example of fine coach building. Low, graceful, smartly upholstered and attractively finished in Dodge Brothers blue, it reflects dignity and distinction in every line.

Above all, the 4-passenger coupe is characteristically a Dodge Brothers product. It possesses all the attributes of construction and low-cost service for which more than a million Dodge Brothers Motor Cars are favorably known throughout the world.

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Want to Sell These Fruits or Vegetables?

If you have any of the following to market, it will pay you to get full information about the advantages we offer:

Apples	Grapefruit
Oranges	Cherries
Lemons	Peaches
Pineapples	Pears
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Plums	Grapes
Bananas	Tomatoes
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Cantaloupes	Celery
Cucumbers	Onions
Cauliflower	Potatoes
Asparagus	Peppers

More Dollars for Fruit Growers

is the title of an interesting book that tells how to get highest market prices; how to get your money within 24 hours after sale; how to eliminate rejected cars, etc. Send for a free copy.

The Fruit Auction Co.

Established 1896

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MARKETS AND MARKETING

INASMUCH as all permanently successful business is the result of giving and getting a square deal, the fruit grower, who now feels that he is not being treated fairly, must be able to show that he has done his part before he can pass the blame to some other person. The grower's obligation does not stop when he has grown a good crop of good fruit, graded it honestly, packed it carefully and turned it over to be sold. Someone must get it to the right place, at the right time and in the right amount, with the least expense, with the smallest loss and with proper stimulation of consumption, especially in years of an "oversupply." If the grower is not willing or able to do all of these things and many more, he must not complain if the person who does do them charges a seemingly high price for his work. Co-operative shipping associations are organized to do this work for their members, but not all associations have the facilities or competent management to do the work, and it is right at that point that most growers' organizations fall down.

Are you sure that you are producing the kind of fruit that the trade wants? Are you using a merchantable package? The package that the consumer will buy to take home must be not too large and must have some kind of a handle for convenience in handling. Neither the box nor the barrel meets this demand and the result is that the average consumer buys a few pounds of fruit in a sack once in a long time, at a relatively high price. The average family thus served does not eat anywhere near the amount of fruit they should. If the average family buys a dozen apples a week, how long will it take for the consumers to eat up a hundred thousand carloads of apples, each car holding 756 bushel boxes of about 165 apples each? No wonder there is an "oversupply" of fruit, with most consumers in the cities and larger towns hungry for what is being wasted.

How much of your fruit reaches the market in sound condition? Our Northwestern growers have had to take more pains in the physical handling of their fruit and the prompt handling from tree to some cooling device. As a result, their fruit reaches the eastern markets, after its long trip across the continent, in almost perfect condition, while some of our eastern fruit looks as though it had been in a football game, after its travel of one-twentieth the distance to market.

The average grower and even most of our co-operative shipping associations insist upon an immediate sale as fast as harvested and packed, forgetting that a six months' supply of fruit cannot be marketed in one month, without bringing into the deal a lot of speculators, who must be paid for holding and storing and handling and taking the storage and market risks while waiting for the public to get ready to buy and eat. Every move is a speculation. How much of this speculation does the grower or his association want to take? The "cash buyer" is always with us when the deal is profitable—when anyone can sell—but he is noticeably absent when we most need him—when there is no market. With all of our boasted improvement, how much nearer to the consumer has the grower come? How many less of the "middlemen" have we now? There is no doubt that, in too many instances, some of our poorly managed shipping associations have only added their own expense to the original cost of marketing. And in some instances our national marketing organizations have only followed

the lines of least resistance and traveled the same old road—have hardly developed any new outlets or accomplished any great savings.

These queries and statements may sound pessimistic, but they are true and are mentioned so as to establish some of the problems that we wish to treat in these columns from issue to issue. Questions and suggestions are desired and through a thorough discussion, we may hope to find the weak spots and the remedies. Let us have your thoughts.

WHAT is to be the future of the Northwestern boxed fruit business? It is difficult to even make an intelligent guess, but one thing that is happening, that will be a part of the solution at least, is very evident to anyone traveling over the country—thousands of acres of apple trees are being pulled up in Oregon and Washington and few new plantings made. The Agricultural Economic Conference held at Corvallis, Ore., January 23 to 25, made some pertinent recommendations. The apple group recommended that no more apples be planted in the Rogue River Valley and that orchards yielding less than 400 packed boxes to the acre have not a ghost of a chance and that these orchards either be brought up to that standard or eliminated. Unless fruit prices materially advance or freight rates be radically reduced in the near future, the boxed apple supply will be confined to certain varieties which have a chance of competing with eastern grown fruit, nearer the large consuming markets.

VERY little has directly come out of the meeting held by Mr. Sapiro, under the auspices of the Portland Chamber of Commerce last June. The plan that he proposed for co-ordinating the boxed apple districts in the Northwest was thought to be impracticable. However, out of that meeting has come a movement for the organization of the apple growers along lines similar to the citrus exchanges of California and Florida. The committee of investigation has just returned from a study of the California associations that handle citrus and deciduous fruits, figs, olives and walnuts. The committee is made up of J. R. Schwartz, of Yakima; E. H. Moses, of Cashmere; C. King Benton, of Hood River; J. W. Langdon, of Walla Walla, and E. M. Gillette, of Malaga. Edwin Smith is the executive secretary, with headquarters at Yakima. The commission is now preparing a very complete report for the growers. In their preliminary report they say:

"Most of the big organizations of California with a successful record behind them have 'crept before they walked'; they have been of slow and gradual growth along lines of good business sense. The commission's conclusions for organization plans in the Northwest are being formed after taking due consideration of this fact. In molding recommendations, we are firmly keeping in mind the fundamental requirements of the industry, such as a greater consumption of boxed apples; retailer prices that quickly reflect low wholesale values; a greater number of carlot markets; the prevention of congestion in gateway markets; a greater use of cold storage; and lower production and transportation costs. How to improve and govern these fundamentals upon which the success of our industry rests in a sane and sensible manner is requiring a great deal of concentrated thought and hard work."

Better Pumps for 50 years

THAT'S why MYERS builds nearly three pumps a minute during working hours. People know that it's a MYERS pump it's right—sure to give complete satisfaction.

MYERS pumps embody exclusive features, developed through long experience in building pumps for all conditions of service. Wherever you live, there's a MYERS dealer near you. He's a pump specialist and can help you choose exactly the pump you need.

The MYERS Line also includes Ray Pumps and Gear Pumps.

THE E. E. MYERS & SONS CO.

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FIG. 1900

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New Ideas

Cutler's new catalog of Fruit Packing and Grading Machinery is alive with new ideas and authoritative information for the orchardist. Tells packing methods of big, successful growers.

It will do you good just to read it!

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Facts—
WRITE
TODAY!

Just
off the
Press

Free to
growers of
Apples, Pears
and Peaches



"The commission does not intend to propound a plan inflexible and inconsiderate of existing institutions. And above all it does not expect to bring to the Northwest for its adoption a 'California Plan.' Such recommendations as are made will be Northwestern plans, conceived to best meet Northwestern conditions."

EVEN large associations have their marketing troubles. Many packing houses in the Florida citrus districts are closed because the growers are not getting cost of production, even though the city consumer is still paying reasonably high prices. The manager of the Florida exchange stated in a recent public address: "We face a loss of \$15,000,000 this season on account of low returns. We are back where we were in 1904 to 1908." And this with a prospective increase in production of 30 per cent. Nearly one-third of the citrus trees are from one to four years old. In their perplexity, the Florida growers have called upon Secretary Herbert Hoover to organize their industry at a salary of \$200,000. His reply was: "Your telegram is most complimentary indeed. I have a feeling, however, that the problem of Florida marketing is tied to the whole national problem of marketing perishable products and that for the present I can be of greatest service in contributing to constructive handling of its national aspect." Roger Babson, noted political economist, and also interested in Florida citrus growing, was also invited to come to the rescue, but declined. He gave the following views:

"Many seem to think that all that is necessary is to give the exchange a monopoly. All monopolies have failed in the past and this would inevitably fail so long as there is no restriction on the planting of more groves. Most of the money being made in the citrus industry at present is in the sale of groves and new trees, and if the same effort were spent in improving the quality of fruit, a big difference would result. In 10 miles of the Babson Park packing house alone we have a million trees already with only 100,000 or 10 per cent, in bearing.

"It would be suicidal to plant any more for the present, at least, or until the present situation has adjusted itself and the Florida grower realizes that it is only through the closest kind of co-operation that he can succeed; co-operation of the kind that will result in control of the acreage planted, and a rigid inspection leading to the fearlessness and unbiased reaction of all inferior fruit regardless of who the grower may be."

Mr. Babson's advice to the citrus grower is: "Cut out the politics and go to work improving your fruit. Set out more seedless varieties, original Parson Browns and pure Valencias, Florida fruit has too many seeds. Produce quality rather than quantity."

IF GOOD prices for farm products cannot be secured in such years as these, when labor is fully employed at high wages, what prospects have we for the future? How can we overcome the spread between the grower and the eater? In earlier days our problems of distribution were very simple, because people produced most of their needs or were satisfied with near-by products. Now we must have fruits and vegetables out of season and from the most distant climes.

A large part of the spread seems to lie in the inefficient merchandising of fruits and vegetables by the retail merchants. Their usual explanation of high prices for fruits is their loss by decay, due to their holding the fruit and selling it in small quantities. They seem to fail to understand that, if they would place their retail prices on a small margin, they would sell more packages and so make more money. The average fruit dealer would rather sell three bushels of peaches at a profit of \$3 per bushel, than to sell 40 bushels at a profit of \$1 per bushel. Selling associations must be large enough—national commodity organizations—that can afford

to spend money to teach retail dealers how to display and push the sale of fruit in larger sized packages. The limited consumption is not due to a loss of appetite on the part of the consumer but because fruit prices are not attractive—are not properly merchandised. Millions of dollars must be spent to attract the consumers and to show the retailer how he can make more money for himself. He has little interest in the grower or the consumer, but is very much interested in any plan that will bring him more business and more money. The chain stores are increasing their handling of fruits and are already doing good work. Their selling policies are managed by experts and they are setting an example that other dealers should be taught to follow.

If growers are not organized to undertake this educational campaign for more efficient merchandising methods, they will continue to suffer from prices that are far from satisfactory. Dealers that now buy in less than car lots, paying local freight rates and extra profits, must be shown how, by buying in full car loads, they can sell cheaper and still make greater profits.

EFFORTS are being made by port authorities and the trade generally to increase the shipment of apples from America through the port of Manchester, England. The United States Shipping Board steamers maintain a regular service between American ports and Manchester and are carrying consignments of apples at present. They are making every effort to increase the direct shipment of American fruit in American vessels. As financial conditions improve in the old countries, our exports of fruits will rapidly increase.

THE SHIPMENTS of apples from Idaho during the past season have broken all previous records. In 1921, the total shipments were 5825 cars, while up to February 16 of this year, shipments have been 6235 cars, and the total for the season will reach 6500 cars.

Home-Made-Lime-Sulphur for San Jose Scale

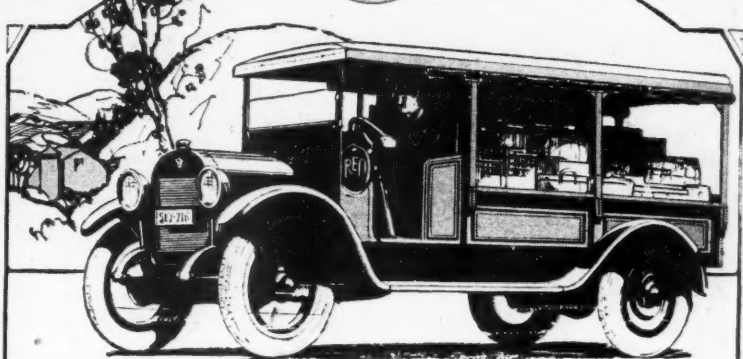
THE NEW YORK Agricultural Experiment Station, in view of the increasing severity of San Jose Scale, is urging fruit growers of the state to make the delayed dormant application of lime-sulphur this spring just as the buds begin to swell. This advice is good not only for New York but for many other states as well.

The dormant spray is prepared by adding one part of concentrated lime-sulphur to eight parts of water. Besides controlling scale rather effectively when well applied, it serves as an effective fungicide as well. There are indications, however, that the oil emulsion, which has been attracting a lot of attention the past couple of years, may be a better material for controlling San Jose scale than lime-sulphur. Furthermore, by mixing other materials with the oil emulsion, it can be made effective against fungi also.

"Home-made concentrated lime-sulphur is prepared by mixing about 40 pounds of lime in a container with a little water to start the lime to slake. After lime is moistened in this way, the entire amount of water, 50 gallons, is added. When the lime is about two-thirds slaked, 80 pounds of high-grade sulphur are added and the mixture cooked for 45 minutes after the boiling point is reached. Water to take the place of that lost in the cooking is added until the mixture is brought back up to the 50-gallon mark. The mixture is stored in airtight containers until needed. This concentrated solution is then diluted at the rate of one part to eight parts of water for use as a delayed dormant spray."

The point of view makes a lot of difference. I saw a very old man pass a much older man. "Hello, Kid!" called out cheery 95 to sprightly 80.

SPEED REO WAGON



Most Working Hours Per Year of Service

SPEED WAGON ability to keep on working puts maximum haulage hours into every year's performance, and most miles into its lifetime.

Certainty and length of operation are based on certain distinctive Reo policies:

Laboratory tests, which determine the quality and strength of materials,—

High manufacturing standards and close limits, which assure almost custom-built exactness,—

Oversized vital parts, to counteract unpreventable abuse,—

Unusual accessibility, so that necessary attention and adjustments need not be shirked,—

Inner-frame cradling of vital units, so that engine, radiator, transmission and other parts are cushioned against road shocks.

Strength is the biggest single requirement of trucks in rural service. Speed Wagon strength—and engine power—have no parallel.

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Between Central Park and Hudson River

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SINGLE ROOM WITH PRIVATE BATH
\$3.00 AND UP

DOUBLE ROOM WITH PRIVATE BATH
\$4.00 AND UP

Other suites in proportion. Also a few desirable unfurnished apartments on yearly lease.

Special attention given to ladies travelling alone.

Exceptional Restaurant at very moderate prices. **S. L. ROOT, Manager**

MCCORMICK-DEERING

EVERY Spring, more farmers are turning to the tractor as the real key to farm profit. The need for more yield, the need for saving precious time, the need for cutting out all surplus expensive labor—for these the logical remedy is *tractor power*.

Tractor owners have increased over 7500 per cent in the United States in the past ten years. The trend of farm power goes onward, never backward. The man who returns to old methods, after tasting the flexibility, the freedom, and the profit in tractor

farming, is so rare that he may be looked upon with curiosity.

McCormick-Deering 10-20 and 15-30 Tractors are built for all-around practical farm use. They are designed and equipped to work with many machines—to handle both field and belt work to best advantage. They are simple, easy to handle, and they will serve their owners many years.

Remember that *the crankshaft and the main ball bearings in McCormick-Deering 10-20 and 15-30 are guaranteed for the life of the tractor.*

INTERNATIONAL HARVESTER COMPANY

606 So. Michigan Ave.

of America
(Incorporated)

Chicago, Illinois



Now, while you have it in mind, write us for a catalog. See the tractors at the McCormick-Deering dealer's.

Lost Opportunities in Farm Fruits

by L. H. Cobb

OUR TRIP last summer through four states showed us lost opportunities everywhere. Farmers will not make the most of their fruit. I am not speaking at random, for I know what some farmers have done with no better chance than hundreds of farmers along the way we traveled, and no place is exempt. Fruit rots on the ground and we paid 15 cents a half peck at a store in a town of 2000 inhabitants and the fruit was very inferior, while we visited a farmer near-by who gave us a bucket-full of the finest fruit we ever ate for nothing as he said there was no sale for it. Why not? I warrant you if such fruit had been taken to that town only a short distance away it would have brought a dollar a bushel and the buyers would have been glad to get it, but those who had it were too negligent to try to sell it if they could not dump it on the local grocer. The grocer would not buy because

fall apples are perishable and he never knew when the market would be filled, for if the farmer sold him a few bushels at a good price, he would proceed immediately to sell all the other stores if he could—when one was supplied all were—while if the farmer had taken the matter into his own hands and either sold direct to his customers or placed the fruit in the store to sell on commission, and only asked the merchant to sell what he could and take back any that did not sell, he would very likely have sold all he had at fair prices. I sold a crop of tomatoes this way one summer when I could not induce a single grocer to buy them direct, as they were afraid of losing them, and they were profitable. I furnished them all with tomatoes and only a small lot at one time and replaced them as needed, and having no loss, they were glad to handle them that way at 10 per cent commission.

Has No Trouble in Finding Market

I have never had any trouble finding a market for plums, cherries, or strawberries when I had a surplus,

and if the locality is not a fruit growing district, where more is produced than will be used by the people around and in the small towns close by, it will surprise you how much fruit will be taken if it is offered for sale. Getting it to the consumer is the point, and often all that is needed is to let the consumer know you have it. Last summer in some orchards in eastern Kansas, early apples were rotting under the trees and a farmer tried to sell some in town and failed, but all over that country were people who would have been glad to have paid a fair price for them if they could have had them. There was no point of contact between the farmer who had and the farmer who had not, for the stores would not risk buying the fruit as it would not keep more than a few days. The use of the phone any evening would have sold every apple, I have no doubt.

A farmer had a long row of grapes and had put up all that was wanted at home and began to despair of selling any as everywhere he asked the merchants told him there were too many grapes and there was no sale

for them. A little local ad made a market for them at a good price and the knowledge that he had grapes spread and he could have sold a lot more than he had. Don't take people's word about everything, but dig in and find out if there is not a market for fruit before letting it rot under the trees and dry up on the bushes.

Berries Hard to Get

In all our travels we could find no berries. We passed up through Missouri from eastern Kansas right in blackberry time and I am especially partial to blackberries. I could not buy a box at any of the small country stores, though they had peaches, pears, plums, oranges and apples shipped in from California or other distant points, and the fruit wagons in a town of good size had no locally grown fruits of any kind, though in season. What a chance for profit lost. In some places we found great patches of berries near large towns and no doubt they had fruit to sell in the stores, but where there were fruit farms at all in most cases there were acres of them. Now the place where the opportunities lurk is where fruit is not grown by others for sale, and there are just such places everywhere—more places of that kind than the other. You have only to grow fruit and let people know about it. Near Elmont, Kan., is a German family who grows blackberries for sale. We wanted some for canning and placed our order weeks ahead but they had so many orders before ours that we got none. They always had berries every year and it was known, so they had a market provided for them before they were ripe. At Maple Grove Farm, near Bonner Springs, Kan., the blackberry and grape rows are near the road, and while I was there one year the berries were spoken for ahead if any surplus should be for sale. There are such locations and opportunities on every hand.

Fair Dealing An Essential Requirement

Fair dealing is one of the requirements of successful selling and this we, too, often find lacking. I have been stung several times by farmers selling fruit, and one day in town I bought a half bushel of apples—or bargained for them—to be delivered at my sister's, who lived on the next lot, and went there while the man was getting his fruit. He brought them in an old gunnysack and when I wanted him to empty them so I could see them, he wanted me to do it and pay him and let him go, but I wanted to see what I had and insisted. The fruit he brought consisted of big, little, rough and smooth apples, and a job lot all round, while the samples he showed me were fine. He put his apples back in his sack and took them with him, and my sister remarked then that the honest farmer would sting you worse than anyone else in the world, but I know better than that. It is the dishonest farmer that does the stinging, and there are no more of them than in any other class of people.

Up in Minnesota this summer, we saw a display of fruit at a stand beside the road and I had the driver get out and buy some. He paid 20 cents for a little over a quart of small rough plums that I am sure were nothing but wild fruit, and wormy at that. I had wanted them because we had been seeing so many fine plum trees all along the way that were loaded with large purple plums and I had supposed that his fruit would be the same. Several had given us nearly as many plums as he sold us when we had made inquiries in regard to the varieties and production, and told us that there was no market for the fruit as everybody had so many plums. Now that man was robbing tourists instead of selling plums, and as a result, tourists will generally drive on and give no heed to wayside stands for they expect to be fleeced. There are honest fruit sellers by the roadside but they have to suffer for the dishonesty of the other kind. Now again we found a place not many miles distant where few plums were

(Concluded on page 37.)

The Orchard Home Department

Mothers and Babies

"WHERE ignorance is bliss 'tis folly to be wise." But where ignorance is death 'tis folly not to be wise. We entertain several pleasant but harmful illusions growing out of our conviction that the United States leads the world. So it does, but not in every particular.

Why is it that there's more danger in becoming a mother in the United States than in 14 other important countries? Why are the lives of infants safer in seven foreign countries than in our own? Our doctors are highly qualified, our climate at least as good as most. Yet last year 23,000 women died in childbirth in the United States.

The reason seems to be that, especially in rural districts, a deplorable ignorance prevails as to maternal and infant hygiene. Almost a quarter of a billion babies under one year of age, die yearly in the United States. Just compare that figure—250,000—with the mortality figures for the world war. Isn't it a horrible thought that the total casualty list of United States soldiers during the war is hardly greater than our yearly loss of infant lives?

This is none the less true, none the less serious, because heralded by no flourish of trumpets, greeted with no outburst of national grief. The fact that one-half of these deaths occur before the infant is six weeks old, points directly to lack of proper condition of the mothers consequent upon lack of proper care before and after childbirth.

It is vitally important that rural communities should interest themselves actively in saving this tragic waste of human life. If every woman who reads this would inform herself of conditions in her community, and would work for better attention and for the spread of better information, especially among the poorer women, many lives would be saved.

The Sheppard-Towner Maternity and Infancy Act, will, it is believed, materially reduce the death rate among mothers and infants. Forty states now co-operate with the Federal government under this act.

African "Men of the Trees"

TO Sir Baden Powell is attributed the honor of having instituted the Boy Scout movement. He had vision and saw true, but it is doubtful whether, in his most hopeful moments, he realized how far his idea would travel. Its genial influence has changed the name and habits of an African tribe formerly known as the "Forest Destroyers," but now self-styled "Watu Wa Miti" or "Men of the Trees."

America, using up her forests five times as fast as they grow, realizes almost too late that such devastation is an injury to her development and that her hope now lies in careful conservation. We will have a fellow feeling for the Africans who now find themselves in the same position. Vast wooded tracts were formerly laid waste by this tribe of "Forest Destroyers," for their system of cultivation was to reap a few crops of maize from the rich soil of the forest and then move on, clearing another "shamba" or plot for planting.

The Forestry Department of Kenya County, Africa, has organized the natives into the Forest Scouts, and instilled into them the meaning of forest conservation coupled with the Scout principle of doing one good deed each day. Thousands of former ruthless tree destroyers are banded together in a solemn pledge to plant ten trees yearly and to protect all of the trees.

It is said that the Kenya colony natives, of Kikuyu origin, show great enthusiasm and the most earnest desire to fulfill their pledges both as to

tree conservation and good deeds. They vie with each other in earning the honor of wearing deservedly the green and white badge of the Forest Scouts strapped to their wrists. Green for the trees, white for the clean heart. It's very good form among them for the heart to be "safe" or clean.

The World on Wings

WHEN women began to drive automobiles, it was accepted that the new invention had fully arrived. Today the latest word in locomotion is flying, and the presence of women aviators suggests that the airplane is about to take its position among the commonplaces of life.

The road to successful flying has been long and arduous. Leonardo da Vinci, whose manifold genius included a turn for mechanics, was by no means the first, but he was the most illustrious of those who centuries ago dreamed of flying through the air. He experimented unsuccessfully with machines that were built by him for that purpose.

Though it took hundreds of years to solve the problem of heavier-than-air machines, once solved, the art of aviation progressed by leaps and bounds. It is but 15 years since the Wright brothers convinced a skeptical public that they were not merely the latest enthusiasts who were doomed to failure.

You may recall that Calbraith Rogers was the first to make a transcontinental flight and it took him 50 days. It demonstrated future possibilities, and there is now a regular air mail service between New York and San Francisco scheduled for 36 hours but occasionally accomplished in less.

And the best of it is—from the viewpoint of popular use of flying machines—that the air mail service has a record of operating one entire year without a single fatality. This should hearten some who have been wondering what we could do for our usual Sunday afternoon family outing if the macadam roads continue to show an ever-increasing throng of pleasure cars.

Dutch Courage

WHY SO brave a little nation as Holland was ever made the subject of such a slurring term as "Dutch Courage" is hard to explain. Dutch Courage, as everyone knows, is not native daring but the kind of audacity men may show when excited by hard liquor.

Yet the term has stuck and facts today prove that such courage works as well before a drink as after. Men do not now wait until exhilarated by alcohol to show a daring that disregards all hazards. In eager anticipation of that unlawful but longed for state, they risk their very lives by consuming bootleg liquor.

Investigators have concluded that little of the whiskey drunk in America today is smuggled in. The greater part, we are assured, is the moonshine of shady qualities among which may be found lye, "red ivy ooze" and iodine. How long would women hold their position as household cooks if they mixed such stomach foes with the food? Prison fare is the best they could hope for after such manipulations.

Of the whiskey men buy nowadays, it is known that the authentic appearance of the container and the price demanded carry no assurance of the quality of the contents. Imitation of the real article is now so clever that it takes a chemist to distinguish between "safe" and "sudden-death" whiskey. Truly it takes a doughty soul to embark on such adventure.

The Dissatisfied Sex

"FRIENDS and fellow women," said the very breezy member of the local League of Progressive Farm Women. "I've been making a few investigations lately as to why we are so often called the 'dissatisfied sex' and as to whether we have any reason for dissatisfaction."

"After we got the vote, quite a few of us thought that we had grown up to the full stature of an adult in the eyes of the law and of society. We felt glad that we were no longer regarded as the very little sisters of great, big brothers. Maybe we had to stand on tiptoe to do it, but we believed that our heads were at last on a level with theirs."

"In fact, we've read and heard so often how dissatisfied and grasping women have become, that we felt uneasy lest we were claiming more than our just share. You can't answer an accusation like that unless you know the facts. Look them up."

"I wonder if you know whether your state is one of those that deny you anything like the same right in your children that your husband has. Maybe he can even will them away from you and appoint a guardian whom you think absolutely unfit to take charge of them. In some states you mothers are entitled to nothing more than 'respect and reverence' from your children. You're lucky if you get that when they know you haven't a thing to say as to their religion, education or occupation."

"Property and inheritance laws discriminate against women more or less—chiefly more—in any number of states. I wonder if your state gives you control of your own property. I wonder if it gives you a right to your earnings. Maybe they belong to your husband. Would you get equal pay for equal work in your own home state? If so, you are luckier than most."

Our Husbands Are Good Men

"Do you feel that we ought to be satisfied with such laws? Yes, I know what you're going to say. OUR husbands would never, never in this world take advantage of such laws in respect to our children, our property, our earnings, our personal liberty. That's true enough. Indeed they are so dear and generous that, as a rule, we get considerably more than we deserve. And we love 'em for it. Of course, we do."

"But what about those women who are married to selfish men or bullies? There are a few still extant. I think we ought to feel 'dissatisfied' for those unfortunate women and try to get these bad laws changed. Our nice husbands should be glad to help us do this when they know how unfair some of the laws are to women."

"You must see now that there's no legal equality. But what about social equality? You say, rather unthinkingly, that after all the law doesn't enter so much into daily life and we certainly do stand on an equal plane with men socially. You ought to know better."

Only a Woman

"Just on my way here someone told me that Rosco Feinartz, the one who writes those splendid art criticisms, is really a woman. To be sure it is claimed that there is no such thing as sex in art, but she's taken a man's name because she knows her writings will be read with more respect if no one guesses the shameful secret that she is only a woman. So don't tell."

"In England they seem even to doubt a woman's right to a normal human appetite and dependence on food. The unemployed over there are in desperate straits. They're starving. There are literally hundreds of thousands of them out of work and a large number of them are women."

"In order to keep this great army

of unemployed alive, a system of doles has been established. But the doles, if I am rightly informed, go only to the men out of work. The women out of work get no doles and presumably mighty little to eat."

"You've all read about that much lauded landlord who actually welcomes couples with children to his rented apartments. Such is his love for children that he encourages large families by giving a bonus for every child born in these apartments—\$50 for every boy and \$25 for each girl. That seems to cut us right in two, doesn't it?"

It's Oh! to Be a Boy

"No, we do not stand on a social equality with men even in our own eyes. That really annoys me in women. We are not going to be taken at any higher valuation than our own. Why is it that the arrival of a girl baby is so generally spoken of, rather quietly to be sure, as a 'disappointment'? Of course, she's welcome, but then, naturally, they did hope for a boy."

"Positively, I'm alarmed sometimes for the future of the feminine sex. If science attains the end which is already claimed to be in sight, and can predetermine sex, producing boys or girls at will, do you suppose that we women will become extinct? That's a lonesome thought. However, there would be some comfort in the knowledge that men couldn't possibly be more than one generation after us in falling into the bosom of mother earth, leaving none behind them."

"Perhaps, when we get those unjust laws altered, we could enact one requiring couples to alternate the sex of the children. Or maybe, in that distant future when laws and opportunities are equal for women, it will be just as fine to be born a girl as a boy. Then nature might be left to take her own course."

"Goodbye, girls. I'd love to stay longer, but John's promised to come home early and fix up a lot of little odd jobs about the house. He's such a comfort. What I'd do without someone who doesn't hammer their thumb every time they drive a nail, I don't know. Men are entitled to feel superior when it comes to that."

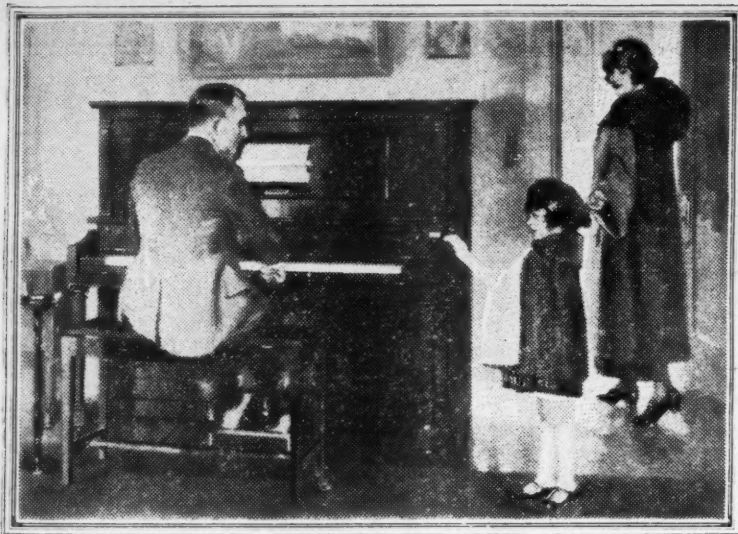
By the Way

At Imbler, Ore., 150 farmers enjoyed a banquet on January 11 that was composed largely of farm products and cost them 16 cents per plate. It was estimated that this meal would have cost \$1.55 per plate at any Portland restaurant.

The Bible is printed in 400 languages and dialects in this country alone, according to Dr. Winship, editor of the Education Journal of Boston; yet not one-half of the people in the world would be able to read it in any one of these languages or dialects.

If game is getting low around your section, you may be encouraged to take some measures to protect it by learning of the splendid success met with in saving the buffalo, which naturalists thought doomed to extinction. In the great Buffalo Park at Wainwright, Canada, 2000 buffalo were ordered shot when the animals migrated to winter quarters, in order to assure enough forage for the immense-ly increased herd.

(From "The Everlasting Mercy.")
Each one could be a Jesus mild.
Each one has been a little child.
A little child with laughing look.
A lovely, white, unwritten book;
A book that God will take, my friend,
As each goes out at journey's end.
The Lord who gave us Earth and Heaven
Takes that as thanks for all He's given.
The book He lent is given back.
All blotted red and smudged black.
—John Masefield.



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one in the family loves to indulge in!

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We guarantee it for 15 years—it should last many more.

Send for Free Sample
Example: Cut it open! Test it. Judge its remarkable quality. Write for free Building Material Catalogue.
Order the roofing you need. Catalogue No. 174-300. State color—red or green.
Shipped From Price Per Roll Order From
Chicago 1.85 Chicago
New York 1.85 New York
St. Paul 1.85 St. Paul
Portland, Ore. 1.85 Portland, Ore.
Houston, Texas 1.85 Houston, Texas
Oakland, Calif. 1.85 Oakland, Calif.

Add 10¢ for extra long nails
Shipping weight 85 pounds per roll

Montgomery Ward & Co.
Chicago Kansas City St. Paul Portland Ore. Ft. Worth Oakland Cal.

CHATS WITH FRUIT GROWER'S WIFE

By HAZEL BURSELL



Seam Finishes and Their Uses

ONE OF the things that gives garments a "home-made" look when finished is the choosing of the wrong kind of seam for the place. This article is intended to tell you just how to make the common types of seams, and suggest the best uses for them.

One of the most useful types is the French seam. It is made by basting the two edges together with the wrong sides in, and stitching so that the seam comes to the right side first. Press the seam open so as to get a "clean edge" next turning. Then trim the seam till it is quite narrow, turn the seam to the wrong side, pulling the goods back over it. Then baste again and stitch, far enough from the edge so that the first seam will all be inside with no ravelings showing through to the right side. Press again.

Uses of French Seam.

The French seam is the one most commonly used in all body seams where the goods is not too heavy, and the seam won't be bulky. Many woollens are too heavy for this type of seam. Plain sleeves (ones with few gathers at the arm's eye) can be put in very neatly with the French seam. The French seam is often used in underwear, but the Flat Fell, described later, is even better for this purpose. A very tiny narrow French seam may be used in joining thin goods, embroideries, and laces very well, as it can be made to the width of a darning needle in thin goods.

The False French seam, so-called because it looks much like the French when finished, is quite useful also. It is made by stitching a plain seam with the two right sides together, the seam coming on the wrong side in the first stitching. The seam is made quite deep— $\frac{1}{4}$ to $\frac{3}{4}$ an inch—so as to allow for the finish. Then turn each of the two raw edges in towards the center of the seam, and baste together. Then stitch with the machine as close to the edge as possible. Press the seam flat after both steps in making the seam.

Used Around Curves.

The False French seam may be used any place the French seam is used, but it is more clumsy and harder to make. It is often easier to use around curved seams, as it would be hard to allow just the right amount for the second turning of the French seam around the curve. If the allowance wasn't just right the two edges would not go together right. It can be used in heavier goods to better advantage than the French also. I believe its most common use is in skirts, made of fairly heavy material.

The Flat Fell seam is a very neat and useful method of joining. You will know it by the fact that two rows of stitching show on both sides, and the fact that it really lays flat with the goods.

To make the Flat Fell seam, make a deep plain seam to the wrong side, as in the beginning of the False French. Then press and trim one side to $\frac{1}{4}$ of an inch or less in width. Fold the deeper side down over the narrow side so that the finished seam is $\frac{1}{4}$ inch deep or less in sheer materials, basting the seam to the goods as you work. Then stitch as close to the edge as possible, and press.

The Flat Fell seam is used almost exclusively in men's shirts, women's shirt waists, and men's heavy work clothes. It has been found most satisfactory for women's underwear as it lays flat and allows for "a good fit." It is a seam which gives good service.

Variety of Plain Seams.

Then comes the plain seam, which is the ordinary familiar type, with one stitching and the raw edges to the wrong side. This may be finished in a variety of ways according to the purpose of the seam. In wool goods, perhaps the most common way is to notch the edges with the scissors, or "Pink" them as the process is called. Then press the seam open with the edges out flat. This makes a neat finish and prevents raveling. It is most commonly used in the under arm, shoulder, and skirt seam. Neck bindings are often finished in this manner on the under side.

Another method of finishing the plain seam is by binding with a piece of thin silk in the ordinary way. The two edges are left together for this method. This is the usual way of finishing the arm's eye seam (when the sleeve is put in the blouse). It is often used in kimono or bathrobes, also, when the two edges are often bound separately and pressed flat.

Plain seams that will not get heavy wear may be overcast with thread and needle, each edge being done separately and pressed down flat. Shoulder and under arm seams are often given this finish.

May Hem the Edges.

Another finish for the plain seam is to take a deep seam and then stitch each edge back on itself, so that when the seam is pressed out flat the raw edge will be turned under. This is suitable for shoulder and under arm seams, and is also used as the finish for the neck binding, on the inside of the garment.

Pictures for Your Own Room

THE MOST intimate place in the home is your own bedroom. In it the things which lie nearest your heart find a place. In that room should go the pieces of furniture which are particularly yours, the colors which appeal to you most, the sort of rugs and pictures you especially like.

In this room it is quite right to hang the photographs of the family, for what could be more personal than photos of the individual members of the family or "best" friends? Photographs, being personal, do not belong in the living room, which should reflect the tastes and spirit of the family as a whole. The living room will gain in charm and good taste when family portraits are banished from its walls.

It is not necessary that photographs only should find a place in your own room. If you have a special liking for some particular picture or group of pictures, why not hang these where they will be your constant companions, as they will be if hung in the bedroom? Do not select a picture which will have only a momentary appeal and of which you will soon tire. Pictures, like other belongings, "fall" on their owners after a time if they are not selected with great care and forethought.

You should consider furnishings, lighting and wall space in buying pictures. A light and cheerfully decorated room calls for pictures in the same mood. A man would never want the frivolous type of picture but something more in keeping with his interest, ideals and hobbies.

There never was a time when it was easier to find just the right pic-

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ture for each room, and at comparatively low cost. Excellent reproductions of the best paintings of ancient and modern masters make it unnecessary to use poor pictures. Cheap chromos and old lithographs are now a thing of the past. For the girl, there are many magazine covers and an occasional calendar done by a real artist, which, when framed, will go very nicely in her bedroom. They should be selected with the greatest of care, however. The art of framing too has been improved, the frame now being chosen to harmonize with and bring out the best in the picture.

The happy height for hanging most pictures is about level with the eye. Half the delight of a picture is lost when hung so that the head has to be tipped back in order to see it. Neither should it be necessary to stoop to see a picture. Large pictures should not be crowded together, nor should small ones be scattered about in wide spaces, seemingly alone and lost. A grouping arrangement is now preferred for smaller pictures.

A picture that is wider than it is high will not fit into a vertical wall panel, nor will a vertical picture look well on a wide space, such as over the mantle or book-shelves. Moreover, over-large pictures will spoil any room in which they are hung, unless it is very spacious and high-ceilinged.

Carefully selected and thoughtfully hung pictures will prove an ever-growing delight, as well as a thing of great decorative value. Good pictures make excellent gifts on birthdays and other occasions, provided the giver understands his or her friend well enough to choose wisely.

To Lengthen Sports Skirt

IF YOUR daughter's sports skirt has become too short, you can lengthen it easily and smartly. Add a hem of grosgrain ribbon in black or harmonizing color to the skirt. Perhaps you can sew on a band of the ribbon around a few inches above the hem, or add touches of the ribbon effectively in other parts of the costume.

Use Rubber Rugs

RUBBER mats or rugs can be placed on the floors or linoleum in the kitchen where the most wear comes. They will not only save the floor but will make for greater foot comfort. They are not expensive and can be purchased in varying sizes. One woman has advocated using a small rubber mat in front of the piano to prevent wear on the expensive rugs from the heels of the pianist.

Jellied Desserts

TO MANY farm housewives the word "dessert" means pie, cake, cookies, pudding or fruit sauce—these and nothing more. They overlook almost completely a large class of inexpensive and easily prepared desserts, which are as pleasing to the palate as to the eye. Jellied desserts will furnish a welcome change, both to the cook and the family, if substituted occasionally for the usual daily pastry or pudding. These latter desserts fall under the class of "heavy" desserts and are too rich to be served at the close of a meal already high in food value. Jellied desserts are just as delicious, though less "filling," and therefore afford just the right finish to the heavy dinner.

A delightful color note may be added to a dinner or luncheon by the use of these jellied desserts as they are made with the natural fruit colors and flavors. They may be served in most attractive ways, providing the housewife can secure the desired moulds. They may be transformed into richer last-course dishes by using whipped cream, marshmallows, etc. The jellied dessert recipes given this month will give the housewife new possibilities for fruit desserts.

Lemon Jelly

3 t. gelatin 3 T. lemon juice
6 T. cold water 6 T. sugar
1½ c. water

Swell gelatin in cold water. Dissolve sugar in lemon juice and water. Dissolve swollen gelatin over hot water. Combine the mixtures, strain into wet moulds and chill until firm. It is best to set moulds in ice water in the summer season. Individual moulds are preferred. Loosen edges of jelly with pointed knife and unmould by inverting and applying a cloth wrung out of hot water to the bottom of the mould for just an instant. Serve with sugar and cream or topped by whipped cream.

Orange Sponge

5 t. gelatin 3 T. lemon juice
½ c. cold water ½ c. sugar
1½ c. orange juice 4 egg whites

Make as for lemon jelly by swelling and melting gelatin over hot water and mixing with fruit syrup. Set aside to get firm. When nearly firm, beat thoroughly, add stiffly beaten whites and beat until it will hold a drop on the surface. Pile in glass dish. It may be served with soft steamed custard, flavored with orange.

Coffee Jelly

5 t. gelatin 4 T. sugar
½ c. cold water ½ c. boiled, strained coffee
1 c. boiling water

Soak gelatin in cold water. Make coffee syrup. Add boiling syrup to gelatin, strain and pour into moulds. Set in pan of ice water to get firm. Serve with whipped cream or cream and sugar. Recipe serves six.

Banana Sponge

5 t. gelatin 2 T. lemon juice
½ c. cold water ½ c. banana pulp
4 T. boiling water 2 egg whites
½ c. sugar

Soak gelatin and add boiling syrup of water, sugar and lemon juice. Set in ice water until it begins to stiffen, add sieved banana pulp, and beat gelatin mixture. Then fold in beaten egg whites. Serve in individual glasses. Recipe serves six persons.

Snow Pudding

4 t. gelatin Shavings of lemon
½ c. cold water rind
1 c. boiling water 3 T. lemon juice
½ c. sugar 3 egg whites

Soak gelatin and make lemon syrup as in other gelatin recipes. Beat the gelatin when it begins to stiffen. Then fold in the beaten egg whites. Pile in glasses and serve cold. Recipe will serve six.

Jellied Prunes

5 t. gelatin ½ c. sugar
½ c. cold water 2 T. lemon juice
1½ c. prune water 15 cooked prunes

Soak gelatin in cold water. Make syrup and add boiling to gelatin. Coat moulds with syrup, and let set slightly. Arrange prunes (3 each) in moulds and pour on rest of syrup and gelatin. When firm serve with whipped cream.

Strawberry Bavarian

3 c. crushed, ripe strawberries 2 T. gelatin
1½ c. sugar 6 T. cold water
1½ c. sugar 2 c. cream, whipped
Soak gelatin in cold water until swollen, then melt by setting over hot water. When gelatin is fluid, stir into sugar and strawberries. When this mixture has set till syrupy, fold in whipped cream and chill. Serve with whipped cream. This recipe serves six.

Orange Charlotte

½ box of gelatin 1 c. orange juice and
½ c. cold water pulp
1 c. sugar 3 egg whites
3 T. lemon juice 2 c. whipped cream
Soak gelatin in cold water and melt over hot water. Add sugar, lemon juice and orange juice. Chill in pan of ice water. When quite thick, beat with wire whip until frothy. Then add whites of eggs beaten stiff and fold in cream. Line a mould with orange sections, turn in the mixture and chill. When ready to serve, remove from the mould as directed for lemon jelly. Garnish with whipped cream.

Chocolate Mousse

½ envelope of gelatin 2 sq. chocolate
1 c. cold water 1 c. sugar
½ c. boiling water 1 t. vanilla
Soak gelatin in cold water until swollen. Melt chocolate in boiling water and add soaked gelatin, then add sugar and vanilla. Cool and add whipped cream. Fill a chilled mould or ice cream freezer with mixture, adjust cover and pack in rock salt and finely crushed ice, using equal parts. Let stand 4 hours.

Kumquat Jelly

1½ c. kumquat juice 1 T. gelatin
½ c. sugar 2 T. cold water
½ c. lemon and Speck salt
orange juice
Wipe ½ box of kumquats, cut in slices, add cold water to cover. Bring slowly to boiling point and cook for ½ hour. Strain. There should be 1½ c. juice. Heat to boiling and add gelatin soaked in cold water. Add salt and strain into individual or serving moulds. Chill and remove to serving dish. Garnish with halves of kumquats which have been cooked in syrup until soft and then drained and rolled in sugar.

Jell-O Desserts.

Many delicious desserts in a wide variety of colors and flavors may be easily and quickly prepared from Jell-O. It is inexpensive and even more easily prepared than when made in the usual way with gelatin. Each package contains Jell-O recipes.

Table of Measures.

1 T. means 1 tablespoonful.
1 t. means 1 teaspoonful.
1 c. means 1 cupful.
1 pt. means 1 pint.
1 lb. means 1 pound.
All measures are level.

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In general appearance Union Carbide resembles crushed granite. When dropped in ordinary water it produces the gas which is used for lighting, cooking, water-heating and ironing. This contact with water is accomplished by a simple, easily understood, automatic apparatus known as a generator, which requires no attention except occasional recharging with Union Carbide and water, and emptying of residue which then gives useful service as whitewash, soil corrective or germicide.

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No. 1916. Side-Closing Overblouse.
Cut in sizes 16 years, 36, 38, 40, 42 and 44 inches bust measure. Size 36 requires 2 1/4 yards 40-inch material with 1 yard 20-inch embroidery and 2 1/2 yards of lace.

No. 1987. Dress for Afternoons.
Cut in sizes 36, 38, 40, 42, 44 and 46 inches bust measure. Size 36 requires 3 1/2 yards 40-inch material with 4 1/2 yards of braid.

No. 1719. Smart Model.
Cut in sizes 16 years, 36 and 40 inches bust measure. Size 36 requires 3 yards 36-inch material with 1/2 yard 36-inch contrasting.

No. 1929. The Diagram Explains How Easily This Dress Is Made.
Cut in sizes 16 years, 36, 38, 40, 42 and 44 inches bust measure. Size 36 requires 2 1/2 yards 36-inch material with 3/4 yard 16-inch contrasting.

No. 2035. Can Be Made in An Hour.
The diagram explains how easy this dress is to make. Cut in sizes 16 years, 36, 38, 40, 42 and 44 inches bust measure. Size 36 requires 3 yards 40-inch material.

No. 2044. Smart Style for Ample Figures.
Cut in sizes 36, 38, 40, 42, 44, 46 and 48 inches bust measure. Size 36 requires 3 1/2 yards 40-inch material with 1 yard 15-inch contrasting.

No. 1940. Did You Notice the Diagram?
This dress cuts all in one piece. Cut in sizes 4, 6, 8, 10, 12 and 14 years. Size 8 requires 1 1/2 yards 36-inch material.

No. 2041. Romper for Play Hours.
Cut in sizes 1/2, 1, 2 and 3 years. Size 3 requires 1 1/2 yards 36 or 40-inch material with 3/4 yard 30-inch contrasting.

No. 1942. Apron That Can Be Made in an Hour.
Cut in sizes 36, 40, 44 and 48 inches bust measure. Size 36 requires 2 1/2 yards 36-inch material.

No. 1943. Cheery Looking House Frock.
Cut in sizes 36, 38, 40, 42 and 44 inches bust measure. Size 36 requires 2 yards 36-inch material with 1 1/2 yards 36-inch contrasting and 3 1/2 yards binding.

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See page 49 for notice regarding our Spring and Summer Fashion Magazine.

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Lost Opportunities in Farm Fruits

(Continued from page 32.)

to be seen, and if a few of those many plum trees had been transferred to this locality, the fruit would have sold readily. In the first locality, one big plum orchard was planted for commercial production and the owner was still planting more, so the fruit must have sold to bring him a profit. It is the small home orchard that is to produce a surplus for local marketing that must have the local demand to be worth much as a sideline. It costs too much to market in the commercial way without proper equipment.

Fruit is Always in Demand

It is very little more trouble to take care of a dozen rows of blackberries or a dozen plum or cherry trees than of just enough to supply the home. The surplus is not enough to prevent its finding a market if not too many produce. People eat fruit if they can get it, and will use a lot more than they do if it can be had without the cost being too high. Last summer I camped for a week in a place where gooseberries grew wild. I saw dozens of persons come with baskets and pick them, and they kept on coming long after the berries had been cleaned up. In Minnesota, where I saw so much fruit, people were hunting wild grapes in several places where we camped. The call for fruit is constant and very few will hunt wild fruits these days if they can get fresh, home-grown fruit for a reasonable cost. I have never seen the time when the general local supply of fruits outside the apples and pears and peaches was greater than the demand, though it might be in certain restricted localities.

Consumption of Ohio Apples in Ohio

C. W. WAID, Director of Fruit and Vegetable Marketing for the Ohio Farm Bureau Federation, has collected some figures on the consumption of apples in Ohio, which are significant from several viewpoints.

In 1922, Cincinnati unloaded 1257 cars of apples, of which five cars came from Ohio; Cleveland unloaded 1901 cars, of which 40 came from Ohio; and Columbus unloaded 518 cars, 12 of which came from Ohio.

Putting the figures together we find that these three important cities unloaded a total of 3676 cars of apples and that of these 57 cars, or about one and five-tenths per cent, came from the native state.

In connection with these figures, it should be remembered that Ohio produces a considerable quantity of apples and had a good crop in 1922. Apparently only one conclusion can be drawn from these figures. The people in Cleveland, Columbus and Cincinnati for some reason or other do not want Ohio apples as badly as they want apples from other states.

Is it because of the poor quality of Ohio apples? We do not think so, for we have eaten Ohio apples and know they are good. Is it because Ohio growers do not put their fruit up in an attractive manner? We know that some of them do and sell it under the Buckeye brand. We have seen this brand and know it stands for something. If all the Ohio fruit were put up as well, we venture to say it would not be necessary to ship it out of the state to sell it. If one-half to two-thirds of the fruit tonnage in Ohio could be handled, standardized, branded and advertised through one association, we feel sure the above figures would not be duplicated again very soon.

Of course, it is easy to conclude in such cases that it makes no difference if the apples were shipped out of the state so long as they were sold, but those who take this view should bear in mind the fact that the extra freight paid on such unnecessarily long hauls reduces the growers' returns accordingly.

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This new galvanizing *insulates* the wire with zinc, or spelter. The wire passes through a long molten bath where it accumulates this greater protective coating, thus inseparably uniting the zinc with the steel.

You know, of course, that all fence wire is galvanized—to protect it from rust—to make it last longer, in all kinds of weather.

Perhaps you *don't* know that there's as much difference in galvanized coatings as there is in the thickness of bark on trees.

It is not only the amount of zinc applied that gives the wire long life, but the coating must be uniform and even to be durable and made inseparably a part of the steel.

The temperature of the bath, the great length of time the wire takes to pass through it, the great amount of zinc that can be applied by this process without cracking or peeling—all these are important factors.

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Our Zinc-Insulating process perfectly protects the wire. It repels rust. It protects the wire from the oxygen in the air and the storm elements. It safeguards the steel.

By this process the zinc is practically a part of the steel, giving it a super-protection that adds many years to the life of the wire. As a result, OUR WIRE FENCE WILL OUTLAST ANY OTHER WIRE FENCE MADE, and its use greatly reduces your fence cost per year—to say nothing of the better protection its staunchness and sturdiness insures.

All our Farm Fences—of every brand—American, Royal, Anthony, National, Ellwood and U.S.—are Zinc-insulated—at no extra charge.

Some wire fence makers market several qualities—a very small percentage of their total production bearing even good galvanizing, and that usually sold at a marked price advance. It all looks alike. You can't tell the grades apart. We make one grade only.

When you buy this ZINC INSULATED FENCE you are purchasing added years of fence service, without extra charge.

Your local dealer sells Zinc Insulated Fence and we stand back of him for your protection. We prepay the freight to the dealer.

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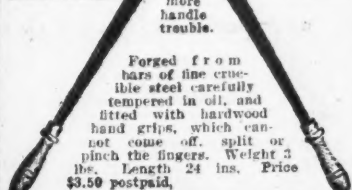


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American Poultry Journal, 427-523 Plymouth Ct., Chicago

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Missouri Poultry Farms, Columbia, Mo.

Profitable Poultry

Edited by
Prof. Frederic H. Stoneburn

Guarding the Chick Crop

IF EVERY egg incubated produced a chick and if every chick hatched grew to maturity, the poultry population of America would increase at an embarrassing rate. But it does not work that way. Vast numbers of eggs do not hatch and each year untold thousands of baby chicks meet untimely deaths, are a direct loss instead of developing into future dollar-bringers.

The success of the poultryman's year hinges, to a marked degree, on his ability to rear the season's crop of chicks. If he fails to rear a goodly number of vigorous young birds, he has no pullets to fill his laying pens, no table poultry to sell on the market. Therefore, no profit in return for his work.

Every chick placed under the brooder has a definite cash value. Every dead chick represents just so much money lost, so much opportunity gone forever. One must expect to lose some chicks even under the most favorable conditions. But it is the part of wisdom to look ahead, appreciate the nature of the common dangers to chicks and then act in such a way as to prevent these from doing the damage.

Diseases—enemies—accidents. All these are ever-present dangers to chick life. It is possible to foresee most of them. And this faculty of anticipating trouble, as well as the needs of the flock, is one attribute of the real poultryman.

Of all chick diseases the dreaded bacillary white diarrhea is the worst. In former years this scourge put many a promising poultry enterprise out of business. Fortunately, the trouble is now thoroughly understood, can be and is being controlled.

This disease is caused by a bacillus—*Bacterium pullorum*—which is present in the ovaries of certain hens. These infected hens lay infected eggs which, in turn, produce infected chicks. The chicks having the disease pass it along to their healthy companions. The surviving pullets carry the organism and when they get into the breeding pens they perpetuate the disease in the next generation.

The symptoms of the disorder are not radically different from those appearing in bad cases of ordinary bowel troubles, as the characteristic white discharge is frequently noted in other forms of digestive disorders. So the appearance of a few cases of diarrhea need cause no particular alarm. But if there is heavy and continuous mortality from acute bowel trouble, which does not promptly yield to simple treatment, one should strongly suspect that bacillary white diarrhea is present. In that event, consult the County Agent or the Agricultural College experts.

Bowel trouble may develop as a result of chilling or overheating the brood, or may be due to faulty methods of feeding. It may affect the whole brood or merely the weaker individuals. So watch the brooder, keep the temperature right and feed carefully.

Some deaths may be expected but prompt attention will usually head off serious loss. Clean up and disinfect the brooder house and its furnishings, especially the dishes for feed and water. Then keep them in sanitary condition. Use any standard diarrhea remedy in the water. In aggravated cases, give the whole brood a purgative dose of epsom salts to thoroughly clean out the digestive tract. Supply charcoal, usually by adding this

to the mash. Feed boiled rice for two or three meals. Sour milk will often prove helpful.

Certain obscure diseases are due to the presence of organisms in the soil, and these frequently appear in broods reared on soil that has been long used as a range for poultry. If it can possibly be arranged, rear the chicks on fresh soil each season.

The natural enemies which prey on chicks are many and varied. Among the night-prowlers, the rats and skunks take first rank. I have known a single rat to kill as many as 50 chicks in a single night, apparently for the mere joy of the killing. Weasels are also destructive, as are certain kinds of owls, but these are relatively rare.

Losses due to the attacks of these pests may be almost entirely prevented through the use of properly constructed buildings. Tight floors prevent raids from underneath. Small mesh wire over all openings in the walls, and close fitting doors, closed at night, repel the invaders. A good dog or reliable cats, trained to leave the chicks alone, will do much toward driving the rats away.

Tramp cats and stray dogs often attack the flocks. The shotgun is the best thing to use in such cases. A fence of wire netting, thrown around the entire chick range, will do much toward keeping these larger animals out, but the cost is usually prohibitive unless the danger is a serious one, due to local conditions.

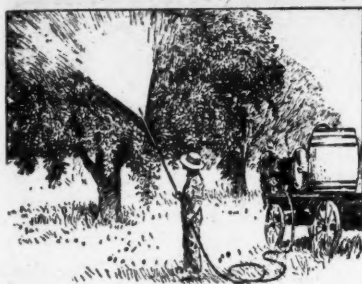
When the chicks are on range during the day, they are the prey of hawks and crows. I dread the crows more than I do the hawks because they are more numerous and when they learn to like chicken dinners they carry off astonishing numbers of chicks, and they are so wise and cunning that it is difficult to check their raids.

Again, the shotgun must come into play. Ordinary spring traps, set on the tops of high poles on which the attacking birds alight to make observations, will often prove effective. Pieces of mirror, placed on tops of fence posts in such a way that they will flash light into the eyes of the birds in the air, have also been found helpful. The destruction of the nests of the birds of prey will often cause them to leave the vicinity.

Make it possible for the chicks to protect themselves against attacks from the air. Provide plenty of shelters under which they may dodge at the first alarm. Low shrubbery and loose piles of brush are excellent. If the latter are covered with vines, such as free-growing squash or pumpkin vines, so much the better. It takes a clever hawk to pull a chicken out from beneath a pile of brush.

Patches of growing corn, sunflowers or artichokes are safe havens of refuge after the plants are two or three feet high. Large frames, covered with burlap and set on short posts, will serve nicely if natural shelter is not available. It is astonishing to note how quickly a big bunch of chickens, scattered over a big territory, will disappear when an alarm note is heard. Once under close cover they are safe. Shelters should be ample in size and so located that they can be reached quickly.

I have frequently scattered a few wise old mother hens, with their broods, around the edges of the range for brooder chicks to act as sentinels. They will usually detect danger before the chicks do and instantly pass

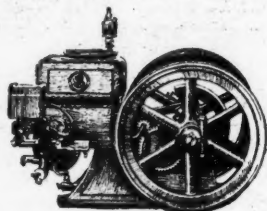


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the word in hysterical hen language. Now turn to the accidents. Chicks are often killed by unfastened doors swinging in the wind. Fasten these securely. Some deaths each year are due to falling objects, like loose boards leaned against the buildings. The way to prevent this is obvious.

Sudden rain storms or squalls, so common during the spring months, are a fertile cause of serious loss, especially among the younger chicks which do not have the protection of full coats of feathers. They quickly get wet and chilled and are unable to make their way back home. Often they bunch up under the slight protection afforded by shrubbery and practically drown, heads in air and mouths open, if the storm is a severe one. Safety here lies in rounding up the flock at the first sign of an approaching storm. On such occasions the poultryman's place is outside; it's no time to remain comfortably under a tight roof. An auto horn, with a penetrating note, is mighty handy to have when it is necessary to start the flock homeward on short notice. A few blasts will usually bring quick action and clear the range in short order. But don't resort to the use of this signal so frequently that the flock becomes accustomed to it and indifferent to the message of danger.

As mentioned last month, the chick doors in all buildings should be wide enough to admit many chicks at a time and so avoid the piling up and jamming which always occurs when a rushing mob tries to force its way through narrow openings. And these wide doors should not be so high above the ground level as to force the chicks to jump up. Bank up the earth outside, or provide a wide bridge from the ground to the bottom of the door opening so the hurrying youngsters can get inside without losing a stride.

If chicks are caught out in a storm and get so wet and chilled that they are apparently dead, place them under a hot brooder, or even in the oven of the kitchen stove if this isn't too hot, and many of them will revive, apparently none the worse for their experience. I have carried such chicks in, literally in bushel baskets, and lost but few of them. Quick attention here is necessary, however.

Open postholes and other deep holes with steep sides are death traps for young chicks. Cover them securely or fill them up. Many chicks are drowned in pails or large cans partially filled with water. Keep such away from the helpless youngsters.

Lice and mites are a constant danger and may do much damage before their presence is detected. Watch for them continuously and fight them tirelessly if they do appear.

There isn't much satisfaction in "locking the stable door after the mare is stolen." This homely saying applies with special force to chick rearing. Many causes, in fact, most causes, of chick losses are known, can be foreseen, therefore can be eliminated. It is right up to the poultry grower to make a survey of his own plant, check up the weak spots and make them right. Thus he can surely save his chicks—and his dollars. If he isn't sufficiently interested to do this he deserves to fail.

Bulletin on Bridge Grafting

WHEN spring opens up after such a winter as the present one, fruit growers will usually find some trees, especially young ones, which have been injured by mice and rabbits unless proper precautions were taken in the fall.

A very timely bulletin pertaining to this subject has recently been issued by the United States Department of Agriculture. It is entitled "Bridge Grafting" and was prepared by Guy E. Yerkes. The methods of handling injured trees are described in detail and many excellent pictures are presented. By following the suggestions given, fruit growers can save many badly injured trees.

Farmer's Bulletin 1369 can be obtained by addressing a postal to Secretary of Agriculture, Washington, D. C.

Plant with Dynamite—to reduce winter kill.



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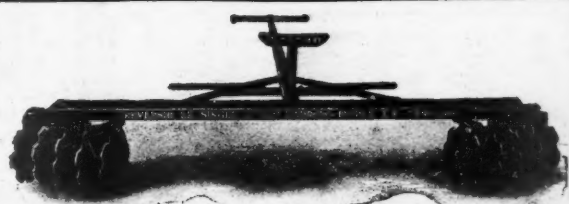
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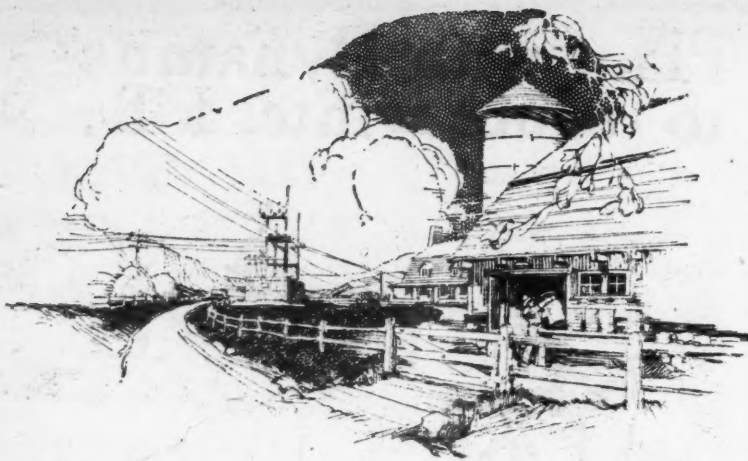
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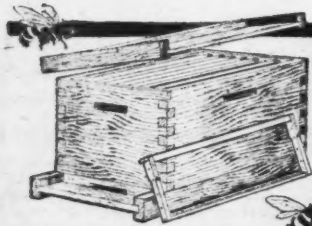


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Brood Diseases of Bees and Their Control

by H. F. Wilson

MANY hundreds of persons make a beginning with bees each year but only a comparatively few remain in the business after a period of two or three years, and even experienced beekeepers are continually dropping out of the business because of the seeming difficulties which confront them. It is quite likely that many of these failures are not so much due to improper attention to the bees as they are to losses caused by bee diseases.

There are a half dozen or more known diseases of bees, but only two or three of these are known to cause serious losses in America. Some of these diseases affect the bees in the adult stages, while others attack them in the larvae or brood stages. None of the diseases of adult bees are causing serious losses in America, al-

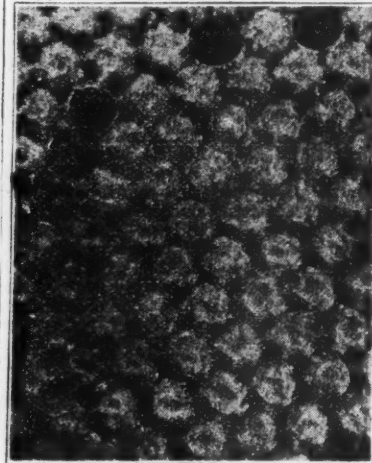
while the body will remain intact and is very tough, so that it is quite easy to remove the dead larvae from the cells intact. If left in the cells, they dry down to dark scales which, in this stage, are more easily removed by the bees.

The general methods of prevention and eradication used for European foulbrood are effective against this disease. If the colonies are kept strong and have plenty of stores the beekeeper does not need to expect any serious damage.

European Foulbrood

The general symptoms of European foulbrood are quite different from those of American foulbrood, although in certain stages the larvae may have a great deal the same appearance as those killed by the other disease. The larvae usually die in the younger stages before the cells are capped over, although it is not uncommon for some cells to be capped and punctured. The disease appears worse in late spring and early summer when entire colonies may die out within a period of a few weeks. As the season advances and honey is coming in abundantly from the field, the bees carry out the dead scales and clean house, so that by the end of the season, the disease may be entirely eliminated. Either the stimulus of the honey flow or the abundance of good food is effective in temporarily getting rid of this disease, although it may continue to appear one season after another. The dead larvae are grayish yellow in color at first, later turning to a chocolate brown. In these early stages of the disease, the breathing tubes or tracheae will appear as distinct white lines showing through the body wall. Later the larvae melt down or lose their shape and then they are found mostly at the back of the cell. The scales formed by the dead larvae are loose and are easily removed by the bees when they are stimulated to carry them out.

One of the present distinctions between this disease and American foulbrood is that just before completely



A close-up view of a section of healthy comb showing the cappings of healthy brood. Young bees have just emerged from the five open cells.

though in sections of the European continent they are quite bad.

There are three brood diseases of bees which occur more or less commonly in different sections of the United States. These are known as American foulbrood, European foulbrood and sacbrood. The first two are caused by specific bacteria which are easy to isolate and determine. The agent which causes sacbrood has never been exactly determined for the reason that the spores or bacteria which cause the disease are so small that they cannot be seen under the highest power of the microscope. For the convenience of the reader, each of these three diseases and method of control will be treated separately.

Sac Brood.

This is the least serious of the three diseases and normally does not cause much loss in strong and well cared for colonies. In some of its stages, it quite closely resembles American foulbrood and might be easily mistaken for it by the inexperienced beekeeper. As in the case of American foulbrood, the larvae die after the cells are capped and the bees may remove the entire capping or portions of it after the bees have started to die. In the case of American foulbrood, there are usually several little punctures in the capping of the cells containing the dead bees, while in sacbrood there is usually only one large one.

If the larva is observed soon after death has occurred, it will be seen to have a slight yellowish tinge, with the front end dark to black. The back part of the body may remain yellowish for some time, but gradually assumes a black color. Often the larvae through the punctured cappings appear brown with a reddish tinge. The internal parts of the larvae may break up and form a watery, granular mass,



A close-up of a section of comb showing larvae that have died from European foulbrood. The side walls of the cells have been broken away to permit taking the picture.

drying down the tissues break up and do not string out like American foulbrood.

However, there is another bacterial disease which, although not injurious to the bees themselves because it attacks the larvae after death, has the effect of making the body tissues stringy and produces the same symptoms as in American foulbrood. No beekeeper should rely on his own observations to determine which disease he has in his yard, although a few more experienced men will be able to distinguish between these diseases. The general plan of treatment for

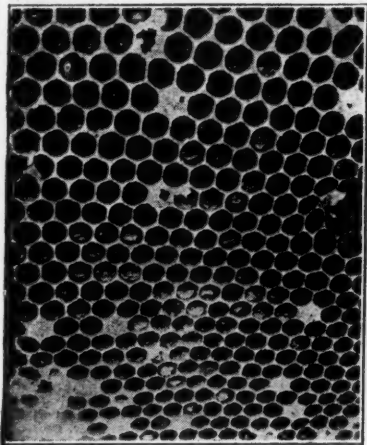
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European foulbrood is based upon the observations which beekeepers have made over a period of many years. It has been noticed that the disease may be very bad in a colony during the early spring and then disappear entirely during the summer. This is undoubtedly due to the presence of a rapid honey flow which stimulates the bees to carry out the dead larvae or scales. The most successful treatment for this disease is to requeen each colony every year. Italian bees seem to be more able to resist the disease than are the ordinary black or hybrid bees. Stimulative feeding early in the spring to take the place of incoming nectar is also effective, and if carefully and thoroughly done, any beekeeper in a locality where European foulbrood is very prevalent can keep the disease out of his colonies almost entirely. The weak colonies should be united with stronger colonies to help in getting rid of the disease. The method in which European foulbrood is transferred is not known, but it is not the same as for American foulbrood, and the shaking treatment as recommended for the



A section of comb badly diseased with American foulbrood. The picture was taken at an angle from above to show the scales in the bottom of the cells.

latter disease does not seem to be in any way beneficial.

American Foulbrood

This disease is by far the most serious one which our beekeepers have to deal with for the reason that it is impossible for the bees themselves to get rid of it, and if not treated by the beekeeper, infected colonies will die out in one or two seasons. Sunken cappings often punctured together with chocolate brown dead larvae are symptoms of the disease. It is practically impossible to remove any of the dying larvae from the cells, as the tissues break up and string out a great deal like melted rubber. In this case, the larvae die while lying stretched out on the bottom of the cells, and when decay reaches a certain stage, they melt down and form a scale on the bottom of the cell, which cannot be removed by the bees.

In examining old combs for the presence of these scales, they should be tilted at an angle, so that the bottom of the cell can be seen and the light reflected so that if scales are present, they can be more easily detected.

When the disease is first introduced into a colony, the few cells which occur may be easily overlooked, but as the season advances, the disease spreads gradually through the brood nest and by fall, thousands of dead larvae in the form of scale can be found in the brood combs which formed the brood nest for any past period.

The method in which this disease is spread is well known and the beekeepers themselves have been responsible for its distribution into nearly every state. The spread of American foulbrood from one state to another over widely separated areas is due to shipping diseased bees and infected equipment or honey, as the spores remain in the combs and infected

honey. Buying up old used hives and combs is a dangerous practice. Second-hand bee equipment or hives should never be bought from any beekeeper who has had disease in his apiary, without him having a certificate of inspection showing that his yard has had no American foulbrood in it for at least two years.

As space will not permit, the treatment of American foulbrood will be discussed in the May issue.

Illinois Fruit Exchange Re-Organizing Under New Co-operative Act

by C. E. Durst

THE ILLINOIS Fruit Exchange is being reorganized under the new co-operative marketing act passed by the last Legislature. This organization is taking place, not because the existing organization was defective, but because the new law is a much better one than the law under which the original organization was formed. It was found impossible to bring the Exchange under the new co-operative act without completely reorganizing, due to the fact that the enemies of co-operative marketing in the Legislature succeeded in passing an amendment which requires the unanimous consent of all members before an organization formed under another law can come under the provision of the new act. This amendment makes it practically impossible to change from one law to the other, for the reason that a single member may prevent it.

Three years ago when the Exchange was organized, it was incorporated under the Illinois Not-For-Profit Act of 1872. This act, while passed for lodges and societies, seemed better fitted for the purpose than the other two corporation laws of the state, and it has served its purpose as well as could be expected. The new law, however, is recognized as being better, and it has been planned from the beginning to bring the Exchange under the new act as soon as possible.

The old organization will not be liquidated at once on account of unexpired contracts, uncollected claims and other obligations. A new corporation has been incorporated under the new act by the name of Illinois Fruit Growers' Exchange. A formidable list of leading growers of the state have signed the incorporation papers. A contract will be made between the old and the new organizations whereby the business and good-will of the old association will be transferred to the new.

The new Exchange will have a five-year contract. Growers will join their local association and also execute a contract with their local association. The local will in turn take out a membership in the Exchange and will execute a contract to market through the Exchange. There are, however, a considerable number of isolated large growers in Illinois, and to meet the situation, the Exchange will receive the individual membership and contracts of such growers direct; in short, such growers will be considered as constituting local associations in themselves.

The new plan of organization seems to be the only logical one which could have been developed under the circumstances, and in our opinion, it should prove a success.

In the original organization, a double membership plan of organization was used and the contract extended from the grower to the central exchange, due to the insistence of the attorney employed in organizing the Exchange, who claimed that under the old Not-For-Profit law, one corporation could not become a member of another corporation. His fears were unfounded, however, for other attorneys later secured the approval of the Secretary of State and Attorney General to incorporation papers which provided for a federation plan of organization.

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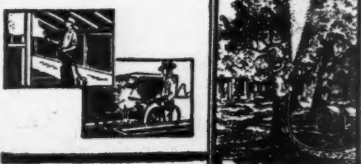
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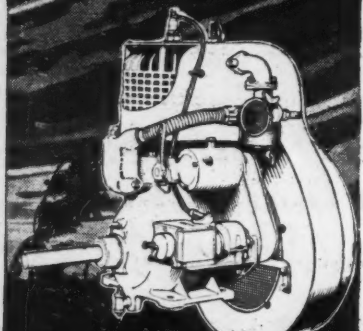
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August 10, 1923.

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Gentlemen—We purchased of you this season three New Way Motors which gives us a total of six of your motors. We have been using these motors for dusting and spraying and they are doing wonderful work. One of the features we like about these motors is that they are *air cooled*, which we find a great advantage over the water cooled engines. They develop *more power* and *give us the least trouble* of any engine we have ever used.

Yours truly,
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BETTER HOME DEPARTMENT

Automatic Electric Water Systems

by E. W. Lehmann

THERE is little question but that the water system is the greatest labor saver that has been invented and made available for the farm home. The automatic electric system, which has come into rather general use in recent years, makes it possible for the farmer to have water under pressure at all times without the chore of starting the pumping engine or pumping by hand. Pressure is always available just as it is in town if there is adequate water in the well and the pumping equipment is properly installed and is given a reasonable amount of attention.

The farmer who has an electric unit of his own, or has electric power from a high voltage line, is considered by the water system salesman as a sure prospect for a plant. From a standpoint of economy in saving labor, it is evident that the man who has electric power and does not have an electrically-operated pump is not taking full advantage of the power he has available. This does not mean that if he already has a windmill outfit on a good pump operated by a gas engine that he should discard these for a new electrically-operated pump, for there are many satisfactory water systems operated from power other than electric.

Many people think the automatic feature of an electric pump is something that is complicated and easy to get out of order, while in fact there is practically nothing to it, it is fool-proof and seldom gives any trouble. There are two types of automatic control, one such as used in the open tank, or gravity system, and the other in the closed tank, or pressure system. With the gravity tank, a simple float is used to manipulate the electric switch. In operation, the float rises and at a set point the switch is automatically opened. As the water in the tank is consumed, the float drops with the water and automatically closes the switch and the water is again pumped to its original high line. Such a switch can be adapted to any open tank, in fact, where electric power is not available, and the pump is driven by a gasoline engine, it may be automatically stopped with such a switch by having it connected in the ignition circuit.

The operation of the automatic switch as used on the pressure system is dependent on the pressure in the tank. It is the most common type of automatic switch because the large per cent of water systems being sold are of the pressure type. The principal parts of the device is a diaphragm on which pressure from the pump is exerted on one side and pressure from a coiled spring on the other side; this is connected up to a quick-acting switch, which opens when the pressure in the tank builds up to a pre-determined point and closes by action of the spring when the pressure drops off to a certain point. The working range of many of the small pumping outfits is from 20 to 40 pounds. When the water is drawn out of the system to a point where the pressure drops to 20 pounds, the motor automatically starts and stops when the pressure has accumulated to 40 pounds.

All of these automatic pumps can be equipped with a fresh water attachment, making it possible to draw water direct from the well at any time without taking it from the tank. This attachment is particularly desirable on warm days when the water

in the tank may have been standing long enough to make it too warm for drinking. The attachment is nothing more than a supply pipe connected to the discharge pipe from the pump between the pumps and the check valve. Since the check valve prevents the water flowing out of the tank, the pump automatically starts just as soon as a fresh water hydrant is opened. To make the water attachment operate, it is necessary to take off pressure for the automatic switch between the pump and the check valve.

Many of the small electric operated systems are equipped with very small tanks of only a few gallons capacity. The result is as soon as a faucet is opened the pressure quickly drops and the motor starts, there being practically no reserve storage supply. With this sort of equipment, the user must depend entirely on the capacity of the pump to supply his needs. It is important therefore to determine the needs beforehand so the proper-sized pump will be selected. It would certainly not be satisfactory to have a pump with capacity of only 75 to 100 gallons per hour, when the faucet at the laundry tubs and the bath tub are opened at the same time. Either some storage capacity or a larger pump, if not both, should be provided. A tank of 120-gallon capacity will not add much to the cost of the equipment and will give adequate storage to prevent starting the motor every time a little water is needed.

Both the shallow well and the deep well pumps may be equipped with automatic control. The shallow well outfit will pump from a depth of 22 to 25 feet. They are usually a very compact unit taking up little space and are usually located in the basement. The pump and motor of the deep well equipment must be located at the top of the well, the tank may be placed in the basement or at any convenient place out of danger of freezing. Where the deep well pump is to be installed in an unheated pump house or exposed place subject to freezing, it should be equipped with a frost-proof attachment. The water is then discharged below the ground level like most of the deep well windmill pumps, as found on many farms. Many deep well pumps, operated by electric motors, are installed in a pit or dry well below the surface of the ground. The pit is made sufficiently large so the pump can be worked on if necessary, drainage is provided and a good tight top. The wires supplying power are led in through a conduit pipe. The result is no pump house is needed. Some manufacturers make a self-contained unit so designed that no protection is needed in the most severe climate. It is set on a concrete base at the top of the well with no protection, without harmful effects. With such an outfit, it would be desirable to use a lighter oil during the winter months; this would take off part of the strain on the motor in starting.

Where an automatic water system is used, the pumping equipment should be kept in first-class running order at all times. Leaky rubbers and gaskets result in inefficient operation. Air leaks cause the pump to lose its prime and the pump may not start immediately. A tight check valve installed on the lower end of the suction pipe of a shallow well

(Concluded on page 45.)

A "Vintage Smoke"

The Major tells Joe Rivers what "tasty-smellfulness" really is

Some time ago Mr. Joe Rivers, a confirmed smoker of Edgeworth, defined the friend-making, friend-holding quality of Edgeworth as "tasty-smellfulness."

In the following letter Major Edmund simplifies this description into one word, "bouquet"—which Webster defines as "an aroma as of wine."

When you have read Major Edmund's letter you can easily convince yourself that you taste tobacco largely with your nose. Fill your mouth with smoke from your favorite tobacco and then pinch your nostrils—immediately the familiar "taste" vanishes! Try it! But read this first:

London.

Dear Joe:
Your letter about Edgeworth in the "Saturday Evening Post" for 24th November demands an answer, but I am afraid this effort of mine will not reach you in time to be of much use. Some quick-bring Yankee from Bangor, Maine, will be sure to large in between us. You have hit on something very appealing about in your letter is "bouquet," and Edgeworth is the only tobacco possessing it, so fat as I know. I tried them all, until William Forster of Boston met me in Lucerne one day two years ago and heard me cursing sore tongue. He told me about Edgeworth, and I went to the Post Office and wired London to send me out a sample. Since then—but you know the rest! Edgeworth doesn't need any fine writing to explain it. The "bouquet" you mention varies, for it depends on what you have been eating, what the temperature of your room is, whether your pipe has been preceded by a cigar, whether you have sold out your oil shares at a profit, and how you feel generally.

If you write to Larus again make him pay you a royalty for your discovery (unless he saw it first), and tell him what this elusive beauty really is, and that has made him famous in two worlds.

Yours faithfully, Joe,
James Edmund.

We try to put into the Edgeworth blue tin a tobacco that has the quality of friendliness.

This quality may mean "comfort" to one man, "flavor" to another, "tasty-smellfulness" to Mr. Rivers, and "bouquet" to Major Edmund. There may, indeed, be some doubt as to just what it is, but there can be no doubt whatever that a great many men recognize its presence.

You may not find Edgeworth to your taste, and then again you may. It may prove to be just the right smoke for you as it has for so many others.

At any rate we'll be glad to have you try it at our expense. Just write your name and address on a postcard and mail it to Larus & Brother Company, 83 South 21st Street, Richmond, Va., and you will receive, postpaid, generous samples of both Edgeworth Plug Slice and Ready-Rubbed.

If you care to write the name and address of your regular tobacco merchant, the courtesy will be much appreciated.

If, after smoking a few pipes, you don't like Edgeworth—well, that's that!

If you do like it, you can be sure that every pipeful will be as good as the last.

To Retail Tobacco Merchants: If your jobber cannot supply you with Edgeworth, Larus & Brother Company will gladly send you prepaid by parcel post a one- or two-dozen carton of any size of Edgeworth Plug Slice or Ready-Rubbed for the same price you would pay the jobber.



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Grape Growing on Puget Sound

by W. A. French

THE PUGET SOUND country has become widely known as the land of cool summers. People living in the interior of the state have developed a habit of spending a part at least of the heated term on the Sound. Many tourists from the Mississippi valley states and the east also arrange their summer schedules to spend a part of July and August camping on the shores of some of the multitudinous bays and inlets of the Sound region, thus escaping the sizzling heat of Iowa and New York.

Another fact which has gained wide acceptance is that the grape-vine loves hot summers. This is, of course, indisputable as regards many varieties. Nevertheless, a grape-growing industry is springing up rapidly in the southern part of the Puget Sound country. It is all due to the development of the Island Belle variety (believed by some authorities to be Campbell's Early) which, through a long period of years, has become adapted to the Puget Sound climate.

Average Farm Consists of 10 Acres

In the Puget Sound country the "little landers" are much in evidence. About 10 acres is the average size of these combined chicken and berry farms. Large farms of an earlier day have been cut up into these small tracts, so planned that every owner can have a waterfront building site. Cheap water transportation to the cities of Seattle, Tacoma and many lesser cities is afforded by a numerous "mosquito fleet" of small steamers and launches, making these little farms especially suitable for fruit growing.

These "little landers" are now planting the new acclimated grapes. It has been found that the Island Belle thrives best near the salt water, the reflection from the water apparently aiding the ripening process. A south, southwest or west slope is preferable in order that the vineyard may receive the maximum of sunshine. It is noteworthy that the Puget Sound summer climate, though comparatively cool, is dry. Practically no rain falls between July first and September fifteenth; and on south and west slopes the sun gets in many fairly good days of work in July and August.

The Island Belle grape, in general appearance, somewhat resembles the Campbell's Early. It has the same desirable characteristics of freedom from cracking and shelling, and like Campbell's Early, the bunches are large, and shouldered. The berries are large and exceedingly juicy. While it somewhat resembles the Concord in appearance, it is clear that it is no relation. This is proved by the fact that it has none of the Concord's peculiar flavor, nor the Concord's tendency to cracking and shelling.

The first grower of grapes in the Puget Sound country, of whom we have any record, was Lambert B. Evans, who homesteaded on Stretch Island, in the eastern part of Mason county, about 50 years ago. He set out about two acres of grapes, mostly Concord and Hartfords. His success attracted the attention of Adam Eckert in the year 1889. Mr. Eckert, coming from the grape growing region of the state of New York, was familiar with grapes. He bought land on the island and began an elaborate series of experiments with 150 varieties.

With a shipment of vines from the east, Mr. Eckert found a single nameless vine which soon began to develop qualities which showed it to be better suited to the Puget Sound climate than any of the other varieties. Many years of cultivation further adapted it to this climate, and as he could not find any other variety just like it, he named it the Island Belle and grafted his entire vineyard into it. Mr. Eckert was for some time an officer of the Nurserymen's Association of the Northwest. He has taken the matter up with many nurserymen and growers and none of them have been able to identify the new grape with any known variety. Hence it has become known as the Island Belle, the only

variety that can be depended on to ripen fully in the cool Puget Sound summers.

In a paper on Puget Sound vineyards, the Western Washington Experiment Station Bulletin says: "For commercial vineyards only the Campbell's Early, locally known as the Island Belle, should be planted." This identification of the Island Belle as Campbell's Early is not accepted by all grape growers of the Puget Sound region. At any rate, through many years of cultivation under the peculiar soil and climatic conditions of the Puget Sound country, it is reasonable to believe that the Island Belle has developed new qualities to such an extent as to be legitimately entitled to be called a new and distinct variety.

Island Belle Grape Growers' Union Formed

The grape growers have formed a non-profit organization known as the Island Belle Grape Growers' Union, with headquarters in Seattle. The purpose of the organization is to co-operate in the growing, packing, shipping and selling of the fruit to the best advantage. The officers are Adam Eckert, president; J. F. Rauschert, vice-president; Charles Somers, Jr., secretary. The directors are Edgar J. Wright, E. C. Suiter, E. Wilson, W. R. Polk, J. Wingert, Carolina Sund; and these are the chief grape growers of the district.

Plantings of the Island Belle have been made as far north as Seattle, though the eastern part of Mason county and the western fringe of Pierce county may be said to be the center of the industry. Though plantings have become quite general among the "little landers" and others in this region, it seems unlikely that the market will be soon overstocked. An estimate has been made that present production is but one basket to 35 people in western Washington alone. In 1922, this local market absorbed 140 carloads of grapes from outside the state.

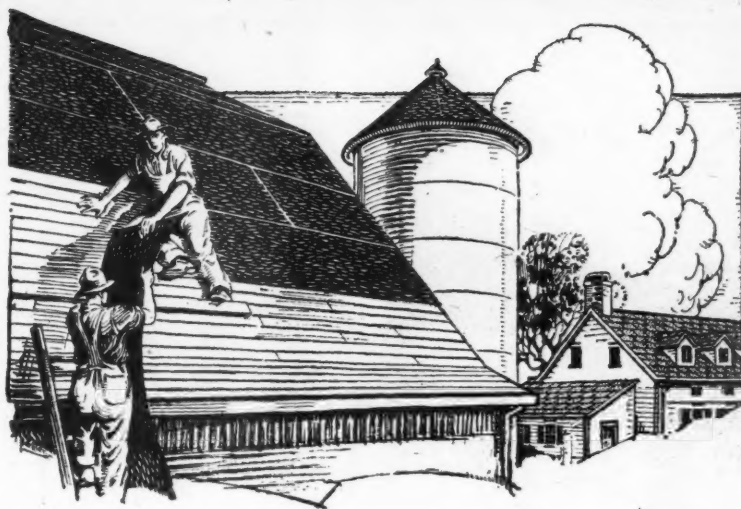
The Island Belle ripens at a time when no other grapes of a similar quality are to be had in any market in the country, and it is planned to eventually ship to all parts of the United States. George Youell, president of the Pacific Fruit and Produce Co., an extensive shipper of fruits, states that his company could handle 50 carloads of 4000 baskets each, shipping to outside markets.

The Island Belle Grape Growers' Union points out that this variety, being an off-season product, is a parallel case to Puget Sound lettuce, which was practically unknown five or six years ago, while in the 1923 season no less than 1300 carloads of head lettuce were shipped to eastern markets. At the time the Puget Sound crop was ready for market the California and Florida lettuce season was over.

The average wholesale selling price of the Island Belle grapes is seven cents a pound, or \$14.00 a ton. A fair average crop is four tons to the acre, though yields of six tons are reported. Two cents a pound will ordinarily cover the cost of cultivating, picking, packing, shipping and selling, which leaves five cents a pound net, or \$100 a ton, which has been the average return for the past six years. Last year's crop was marketed in six-pound baskets and 25-pound lugs or boxes.

At the time of pruning the vineyards last year every scrap of wood fit for propagation purposes was snapped up by nurserymen and growers. Many cuttings are being grown in the Yakima valley in the famous apple country. Whether the Island Belle will thrive as well in the dry, hot summers of the interior valleys as it does in the cool Puget Sound country remains to be determined.

Owing to the profits that are being received from Island Belle grape growing and the increasing demand for the fruit, it is believed that the vineyards will be extended along the labyrinth of waterways of the southern part of the Puget Sound country until there is an area in vines of perhaps a thousand acres—each vineyard having the important advantage of fronting on salt water.



The calendar tells you—

"This is fixing-up time"

Days are getting longer. Work isn't as heavy as it will be later on. April is a mighty good month to fix up the place. A little paint—fences made ship-shape—but most important, those shabby roofs should be replaced by brand new ones.

There's nothing like a new roof to add good looks and value to any building. And when you do re-roof—whether it's house, barn or chicken shed, do it right—re-roof with the toughest roofings you can buy.

Lastingly weathertight: Once your buildings are protected by Barrett Roofings, those roofs are off your mind. No more patching—no more leaks. Barrett Roofings last.

Highly fire-resistant: If flying sparks or embers land on a Barrett Roof they sizzle out harmlessly. This is a big point to folks who live far from a good fire department.

Moderate in price: Easy and economical to lay. There's a Barrett Roofing that's right for every building on the farm.

There is a Barrett dealer in the town nearest your farm—a man who knows roofing from A to Z. Get his advice on your roofing problem.

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Send us your name and address. In return we will mail you, absolutely free, a series of booklets that give valuable facts about the different types of roofing suitable for farm use. These booklets also describe other products of great money-saving value. Drop us a post card or a brief letter—today!

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Everlastic Smooth-Surfaced Roofing

The most popular of plain surfaced roll roofings. Made of best grade roofing-felt, thoroughly saturated with high-grade waterproofing material. Under surface is protected by rot-proof seal-back. Tough, pliable, elastic, durable, and low in price. Easy to lay. Nails and cement in each roll.

Everlastic Mineral-Surfaced Roofing

A beautiful and enduring roll roofing. Mineral-surfaced in red, green, or blue-black. Has rot-proof seal-back. Nails and cement in each roll. Very popular for bungalows, cottages, garages, and all farm buildings.

Everlastic Giant Shingles

These "Giants" for wear and service are handsome enough for the expensive home, economical enough for small farm house or cottage. Their weather side is mineral-surfaced in beautiful shades of red, green, or blue-black. This fadeless mineral surface resists fire and never needs painting. Their base is extra heavy roofing-felt thoroughly waterproof. Because of this extra-thick, extra-rigid base, these shingles can be laid right over the old roof—a big saving on re-roofing jobs. Size 8x12 1/2 inches. Are laid easily and without waste.

Everlastic Single Shingles

Mineral-surfaced in red, green, or blue-black. Base of

best grade roofing-felt. These shingles are staunchly weather-proof, fire-resisting and need no painting. Size 8x12 1/2 inches.

Everlastic Multi-Shingles

Four shingles to a strip. Mineral-surfaced in red, green, or blue-black. Two sizes—10 inches and 12 1/2 inches deep, both 32 inches long. The 12 1/2-inch Multi-Shingle, laid 4 inches to the weather, gives three-ply roof—the 10-inch gives two-ply roof.

Everlastic Octagonal Strip Shingles

The latest in strip shingles. Mineral-surfaced in red, green, or blue-black. Afford novel designs by interchanging red strips with green, or red strips with blue-black.

THE BARRETT COMPANY

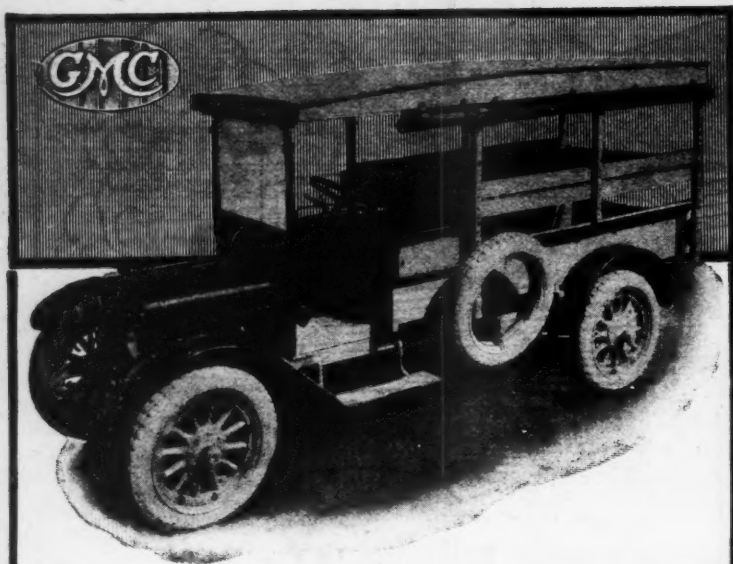
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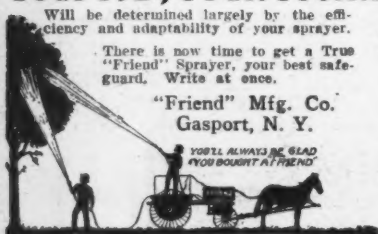
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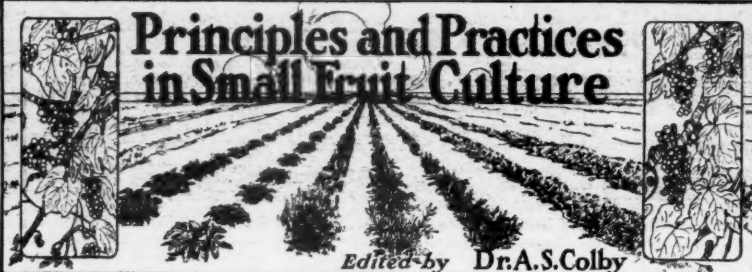
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Control of Anthracnose on Black Raspberries

RASPBERRY anthracnose, a fungous disease especially common on black raspberries, has caused a decrease of from 40 to nearly 80 per cent in the acreage devoted to this fruit during the last decade throughout the middle west.

The complaint has now become quite general that raspberries are

canes practically clean where these two sprays were used. On the check row 89.55 per cent of the canes were heavily infected and 10.45 per cent of the canes practically clean.

The addition of some sticker or spreader has been recently recommended to serve the purpose implied in the descriptive name. Kayso, a commercial casein product, was added this year for the first time to certain sprays for anthracnose control. It is significant that results show much better control with this material than where Kayso was omitted. Where the delayed dormant and pre-bloom sprays were used with Kayso, (one-half pound to 50 gallons of solution) the percentage of heavily infected canes was 9.04 and the percentage of practically clean canes was 90.96. From this year's results alone it is believed that Kayso has possibilities used with the fungicidal spray on black raspberries.

Another line of attack with anthracnose is the breeding and selection of varieties resistant to the disease. In connection with breeding work recently begun at the Station, the Quillen



Buds about one week before blossoming, the time to apply the pre-bloom spray.

running out. It is not so easy as formerly to keep a plantation in full vigor and bearing productive crops. Although there are a number of causes for this condition, the chief reason is the increasing prevalence of fungous diseases. These diseases are, besides anthracnose, crown gall, cane blight, the leaf spots and a group of systemic troubles. The latter include mosaic, leaf curl and eastern blue stem or bramble streak.

It is quite difficult to control most of these diseases. They are also being spread extensively by infected nursery stock. It is, however, possible and practicable to control anthracnose by a consistent spray program even in an established plantation. The ideal way is to start with disease-free plants as far as possible, or failing in that, to cut off and burn the old stub, or "handle" from the old cane which remains after the new tips are dug up and transferred to the new site. Then by clean cultivation, permitting no tall weeds to grow, the minimum of moisture is retained about the young shoots, thus aiding in disease control. The plants must be intelligently pruned, preferably cutting out and burning the two-year-old canes at once after fruiting. Last, but most important, comes thorough spraying, making two applications at prescribed seasons before the blossom buds open. These sprays are known as the delayed dormant and the pre-bloom applications.

We have found at the Illinois Agricultural Experiment Station, through two years' work with anthracnose, that it can be commercially controlled by the application of these two sprays. A brief summary of the 1923 experiment follows:

The first spray was of commercial liquid lime sulphur, dormant strength, five and one-half gallons testing 33 degrees Beaume in 50 gallons of solution, applied as the leaves are unfolding and before they had reached a length of one-half inch. The second application was of summer strength lime sulphur, one gallon in 50 gallons of solution, and the spray was applied a week before the blossoms opened. Both sprays must be thoroughly applied, wetting all portions of the canes. This year's results in a mature black raspberry plantation of Cumberland, showed 26.52 per cent of the canes infected and 73.48 per cent of the



The correct time to apply the delayed dormant spray.

variety, which originated in Indiana, appears to be of considerable promise here as a parent or what is perhaps more doubtful, as a source of more resistant plants through selfing. The Quillen is more resistant to anthracnose than any other variety which we have known and in addition has many other necessary qualifications for success as a commercial sort. The variety and some of its seedlings are being tested out along these lines.

Solving Problems in Fertilizing Strawberries

PROFITS in strawberry growing depend on moderate to high yields more than any other factor. Environmental conditions of optimum moisture and temperature at certain seasons, as well as a plentiful supply of nutrients within reach of the plant, are necessary for these high yields. The application of various fertilizers,

organic spring to contradictions of We are the problem because V. R. G. Experiment 67: "Strawberries in Indiana" son to that where tempera ber of flowers portant directly the plan fall and there a critical life of during ferential The is a str perimer applied time in have li crop ex of the even pr plants t berries efforts conditio in sum then. the fall vent de care of care of

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AT T not held in year, th "The Station Fruits." things paragra the di were of The va without adapted outside tive or discrim good q the sam the nov howeve names grapes red, bla It wa commit writer tion of general plantin meeting tions a ery be represe it will the spr up to tions small Blackb —Red: St. Reg berlan Royal. and V Poorm Straw son, Arom northe Bright Goethe Early, Concor

Did the Pu ment anyone celebr

organic and inorganic, usually in the spring to increase the yield has given contradictory results in different sections of the country.

We are now in a fair way to attack the problem in a more scientific manner because of the results reported by V. R. Gardner in Missouri Agricultural Experiment Station Research Bulletin 67: "Studies in the Nutrition of the Strawberry." His results are of value in indicating the best time in the season to apply fertilizers. He shows that when conditions of moisture and temperature are favorable, the number of flower clusters, the number of flowers and the size of berries, all important factors in the final yield, are directly dependent on the use which the plant makes during the preceding fall and winter, of what nutrients there are available in the soil. The critical period in the reproductive life of the plant lies just before and during this period of fruit bud differentiation.

The practical application for you, as a strawberry grower, from this experiment, appears to be that fertilizers applied in the spring before fruiting time in an established plantation will have little value in increasing your crop excepting in some cases the size of the individual berry. They may even prove a detriment in causing the plants to run to leaf too much and the berries to be too soft. Direct all your efforts toward ideal soil and other conditions after the bed is renovated in summer. Apply needed fertilizer then. Keep weeds down, well into the fall. Spray if necessary to prevent defoliation. In other words, take care of the plants and they will take care of you.

What Small Fruit Varieties Can We Recommend?

AT THE annual meeting of the Illinois State Nurseryman's Ass'n held in Chicago in January of this year, the writer presented a paper on "The Nurseryman, the Experiment Station and the Grower of Small Fruits." We pointed out among other things the fact that the descriptive paragraphs usually run along beside the different small fruit varieties were often misleading and confusing. The variety is praised to the skies without, for example, noting that it is adapted to certain climatic conditions outside of which it will be unproductive or even be killed. Again, little discrimination is made between the good qualities of several varieties of the same kind. This is confusing to the novice. The most glaring offence, however, is found where no varietal names are given, as in one case where grapes are listed simply by color—red, black and white.

It was voted at the meeting that a committee be appointed, with the writer as chairman, to study the question of small fruit varieties worthy of general recommendation for Illinois planting and to report at the next meeting. While in some cases additions and corrections will be necessary before such a list is complete and representative of the state as a whole, it will be of interest at this time as the spring planting season is opening up to give the general recommendations of the Urbana Station as to small fruit varieties for Illinois: Blackberries—Eldorado. Raspberries—Red: Cuthbert, King, Latham, and St. Regis (everbearing); Black: Cumberland and Plum Farmer; Purple: Royal. Currants—Perfection, Wilder and White Grape. Gooseberries—Poorman and Oregon Champion. Strawberries—Premier, Klondike, Gibson, Dunlap, Burrill, Gandy, and Aroma. Grapes—White: Diamond for northern Illinois and Niagara; Red: Brighton, Lindley, Caco, Agawam, and Goethe; Black: Eclipse, Moore's Early, Worden, Hubbard, Wilder, and Concord.

Did you know that in olden times the Puritan Fathers provided a punishment of fine and imprisonment for anyone guilty of the pagan practice of celebrating Christmas?

Apples and Pears Breathe Through the Core

by Brooks D. Drain

WHEN the Creator made the apple, and pear, He ordained that it should grow by the flesh pushing out over the faded blossom. This sometimes leaves a small tube-like opening to the core. Usually this passage is partly or wholly closed by conducting tubes and flesh. This passage is shown in Figure 1, which shows a Delicious apple cut through the core.

Some recent tests by the author at the Massachusetts Agricultural Ex-

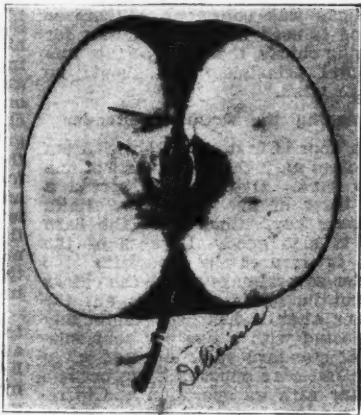


Fig. 1—A Delicious apple cut in half. Arrow indicates air passage to core. This air passage is present in most varieties of apples.

periment Station show that chemical changes go on more rapidly in the core of most varieties of apples. This was shown by measuring certain enzyme activities that promote the chemical changes that take place in ripening apples. Figure 2 is a picture of one of these reactions in the Baldwin apple. The dark area shows where the chemical changes occur more rapidly.

When the air supply to the core is cut off, by sealing with paraffin, these chemical reactions go on more slowly. The fruit, with this air passage sealed, retained flavor better, and tasted somewhat sweeter than the untreated fruit.

Pears with the air passage sealed were ripened at room temperatures and did not "core-rot." This was even true of varieties like Le Conte that are quite subject to core-rot.

The commercial importance of these discoveries is yet to be developed. It is quite possible that oil paper wraps act as a partial seal of this air passage. It would seem like a fairly easy matter to seal the blossom end of

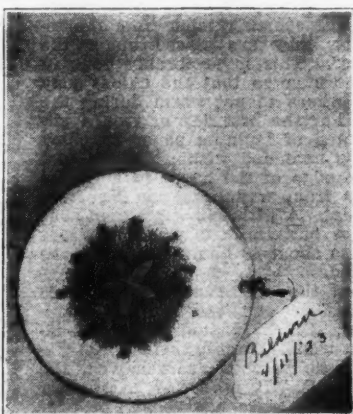


Fig. 2—A slice of Baldwin apple. The dark area around the core shows where chemical changes are taking place most rapidly. The core acts like a ventilator.

Bartlett or Clapp pears and thus prevent much of the core rotting so noticeable with these varieties on our retail pear markets.

A more complete account of these experiments will be given in separate No. 22 of the Massachusetts Agricultural Experiment Station, which will be published soon.



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Automatic Electric Water Systems

(Continued from page 42.)

outfit will hold the water up to the pump level and make it work more efficiently. New leathers in the deep well cylinder or in the shallow well pump will make the pump more positive and result in a saving of electricity.

In any pump installation where an electric motor is the driving power, it is essential that rated voltage be applied to the motor to get the best results. This means that in most cases special wires should be run for the motor. If the motor is connected to a drop cord on a circuit that is already loaded, trouble is almost sure to be the result. It is always better economy to connect motors on special power circuits.



How State Groups of Farmers are Helping the Work of Electrification

Why are many farms along the Pacific Coast and in the Northwest electrified but many more in other parts unelectrified? Local conditions furnish the answer.

Nature made irrigation a necessity on many western farms, and irrigation-water can be pumped electrically at a rate profitable to the farmer.

Population plus use makes electrification possible. Wherever there are electrical uses enough to the mile there electric service is feasible. As we know more about the possible uses of electricity on the farm we shall have more farm electric devices.

Electrical engineers alone cannot solve this problem. Agricultural engineers alone cannot solve it. There must be a thorough, co-operative study. Such a study is now being made by a National Committee of experts. They have organized state groups of farmers to whom electricity is experimentally supplied. These farmers, guided by their state agricultural colleges and by farm-paper editors, keep accurate production costs and compare them with those of the past.

This work is fast revealing so many new, profitable ways of utilizing electricity that thousands of farms will be electrified sooner than farmers realize. Farms already electrified will make even greater use of electric power; others will install electric labor-saving devices in the manner that actual tests have proved to be profitable.

The National Committee in charge of the work is composed of economists and engineers representing the American Farm Bureau Federation, the Departments of Agriculture, the Interior and Commerce, the Power Farming Association of America, the American Society of Agricultural Engineers and the National Electric Light Association.

A booklet has been published by the Committee. It will be sent on request free of charge. Read it and pass it on to your neighbor. Write for it either to Dr. E. A. White, American Farm Bureau Federation, 58 E. Washington Street, Chicago, Ill., or to the National Electric Light Association, at 29 West 39th Street, New York City.

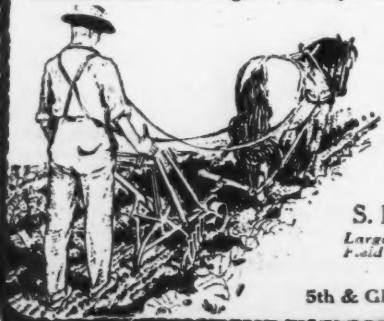
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Artificial Brooding of Chicks

by H. A. Bittenbender

IT WAS only a few years ago that the majority of chicks were brooded on the farms by the old hen. With the rapid increase in number of poultry and the demand for early fall eggs, the hen was discarded and artificial methods of brooding were installed.

There was really a double reason for discarding the hen as a brooder. In the first place the hen's time is too valuable, and in the second place, the labor of brooding many small groups of chicks was enormous. Whatever method is used in supplying heat for brooding chicks, there are certain fundamental principles that should be kept in mind.

Managing the Artificial Brooder

The floor is first covered with from an inch to an inch and one-half of fine sharp sand. Over this is spread a light litter of fine cut straw, alfalfa or clover hay. Chaff from the barn floor is also good. Dryness of the sand is insured by operating the brooder several days before the chicks are put in. This also dries out the brooder after it has been thoroughly disinfected with a five per cent solution of standard stock dip and gives the operator an opportunity to become familiar with its operation and to repair or adjust working parts. Before the chicks are placed under the hover, the beginner should have obtained, and held for a short time, temperatures varying from 75 to 100 degrees. If the brooder does not hold an even heat, with satisfactory housing conditions, the thermostat is probably punctured and may need to be replaced by a new one.

Care of the Chicks

For the first week, a temperature of 90 to 95 degrees at chick level, halfway between the heater and the edge of the hover, is necessary. The second week, 85 to 88; the third and fourth, 80 to 85; the fifth, 75 to 80; and the sixth, 70 to 75. These temperatures are approximate and will vary with the housing and weather conditions. The action of the chicks are the guide in the amount of the reduction. Chicks spread out under the edge of the hover quietly when comfortable at night. If they close in near the heater and pile up, they do not have sufficient heat. If they form in a wide circle or go to the corners, the heat is too great.

Crowding in the corners is avoided by rounding them with building paper or keeping the house cool enough so that the chicks will go to the brooder to get warm. Care having been taken not to chill the chicks when transporting them from the incubator, they are placed under the brooder. This is preferably done in the morning so that the chicks may learn where to get warm during the day. For the first day or two, a circle made of building paper or chick wire is extended within about a foot of the edge of the hover to keep the chicks from wandering too far from the heat. A little chick grit and sour milk or buttermilk is placed in front of them about 48 hours after they are hatched.

From the start, any chick that is crippled or of weak vitality is removed. Chicks pasted up behind indicate usually improper feeding. Unless these patches are removed, the chicks die. It is better to slightly underfeed and underheat brooder than to overfeed or overheat. Care in the management of the brooder and feeding often, a little at a time, overcomes either tendency.

After the second day, if the chicks have become accustomed to the brooder, the guard is removed. If the third morning is bright and pleasant, all the chicks are forced out on the ground even though the snow must be scraped away. At the end of the week, all the chicks are forced out on the ground every day to prevent them getting leg weakness. A good-sized yard is built to keep the chicks away from the old hens and

other chicks of a different age. At the end of six or eight weeks, the chicks usually do not need the heat any more.

Feeding of Chicks

Many different methods of feeding chicks give good results. It is the writer's opinion that a variety of feeds regularly fed in sufficient quantity but not in excess, is the best plan to follow. The Iowa Experiment Station found the following method of feeding to give very good results in rate of growth, in low mortality and in the production of strong, vigorous, healthy chicks. When the chicks are first placed in the brooder, give them an opportunity to drink all the fresh buttermilk that they care for. This may be provided after they are 48 to 72 hours old. If buttermilk is used instead of water to start out the chicks, it seems to give them more strength and allows the digestive system to get into better working order.

There is a difference of opinion as to whether it is better to start the chicks out on grain or on mash. We have secured a little better results by starting the chicks out after they are 72 hours old on both mash and grain. The grain mixture that is used is made up as follows: One pound finely-cracked corn and one pound cracked wheat; or in place a good grade of commercial chick starter. After the third week, gradually work in coarser cracked corn and coarser cracked wheat until the rolled oats is eliminated entirely, and a mixture of equal parts of corn and wheat is used. After the chicks are 10 to 12 weeks old, they can be put onto a ration of: Two parts of cracked corn and one part of whole wheat. The mash that is fed in the start is made up of: Three pounds of bran; two pounds of fine cornmeal; one pound buttermilk (dried); one-half pound bone meal, and one-fourth pound charcoal. If the dried buttermilk cannot be secured, a commercial buttermilk chick mash may be used or a high grade of commercial poultry meat scraps may be substituted.

The mash should be fed in an open self-feeding hopper accessible to the chicks at all times. It is not a good idea to put too much out at a time. It is better to give them a little at a time and make them clean it up. It is not so apt to get dirty and the chicks relish it much better.

Fresh buttermilk may be kept before the chicks in place of water, or some water may be provided. If fresh buttermilk is not available, keep the dried buttermilk in the mash until the chicks are 10 to 12 weeks old. After this time, part of the dried buttermilk may be replaced with 60 per cent protein tankage. After the fourth week, half of the bran may be replaced with shorts and the chicks gradually worked onto a mixture of: 200 pounds ground corn and oats; 100 pounds bran; 100 pounds middlings; 60 pounds dried buttermilk, and 40 pounds tankage.

All of the infertile eggs and dead germs that are tested out of the machine should be hard boiled, ground up and mixed with a sufficient quantity of the mash so that the mixture is moist and crumbly and is fed once or twice a day. It seems as though the hard-boiled eggs give the chicks an excellent start and where available should be fed in liberal quantities. All the chicks will clean up twice a day in 10 to 15 minutes is not too much.

Just a word to tell you how much I appreciate the American Fruit Grower Magazine and your efforts to make it what it is. It is very helpful to me and you can count me as a life subscriber. I have been actively engaged in fruit growing for 22 years and began taking your paper when Charles Green was editor, about 23 years ago.—S. W. Houser, Ohio.

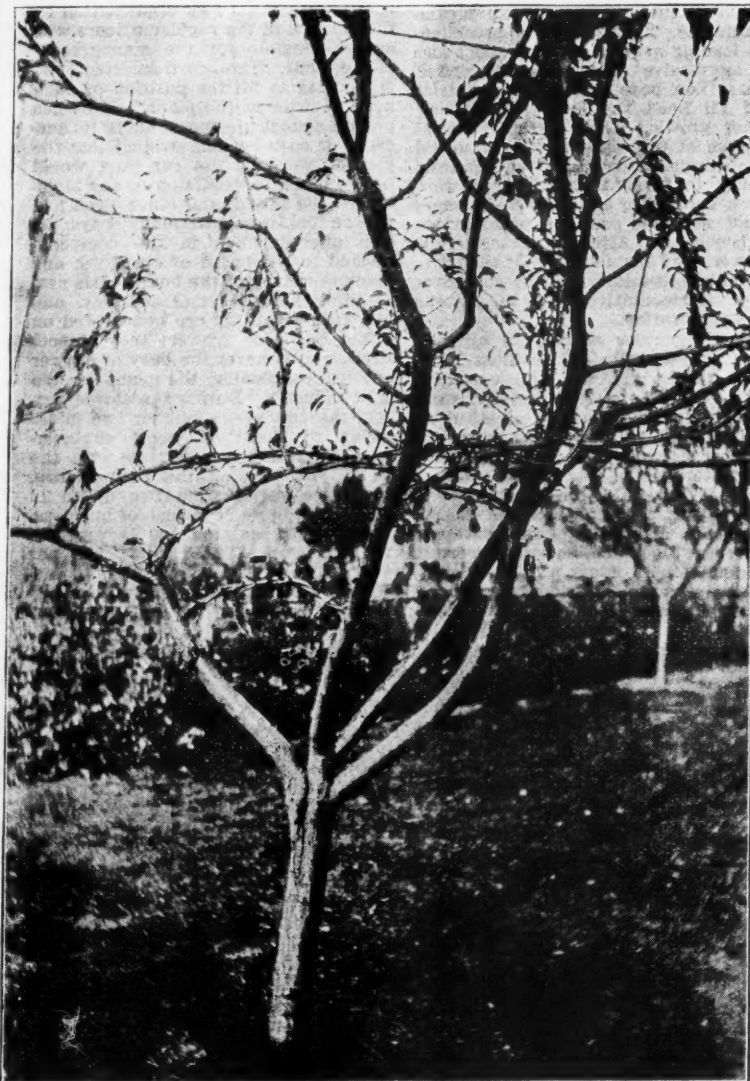
A Natural Brace for Fruit Trees

by Sheba Hargreaves

THERE are various methods of supporting trees that have broken or become weakened by high winds or the weight of ice, snow or fruit, but these are never so satisfactory as the natural brace, which is, in reality, a part of the tree itself. So grow the braces on trees during their early years and thus insure the tree

quires some little time if the trees are large and bearing heavily.

When conditions permit of low heading, as in the few trees about the house or in the small family orchard, there is still another advantage in bracing in this fashion. If the centers of the trees are kept open as they should be, these bridges from limb to



A tree with a weakened crotch—the first season before the brace has grown together.

from breaking under the strain of storm or heavy yielding.

The method of growing a brace is simplicity itself. Just twist or braid pliant shoots from opposite branches together; they should be about the thickness of a lead pencil. Sometimes it is necessary to tie the ends loosely with a piece of raffia or a strip of soft cloth until the shoots bend into shape to remain in contact until they grow together. The middle of summer is the best time to make these braces as the wood must be green and pliant or it may break when braiding it.

The location of these natural bridges must be determined by studying the scaffolding limbs of the trees; the first one may be a foot or so above the crotch with the others spaced to fasten limbs which bear the weight together. This takes all the strain off of the crotch of a tree even when the tree has been allowed to branch into four limbs from one point as shown in the illustration.

In a few years the braces will have the appearance of smooth, solid branches growing between the main limbs of the tree. Even old weakened trees may be braced in this way, providing temporary support is given until the bridges are large enough to hold the weight of the limbs—it re-

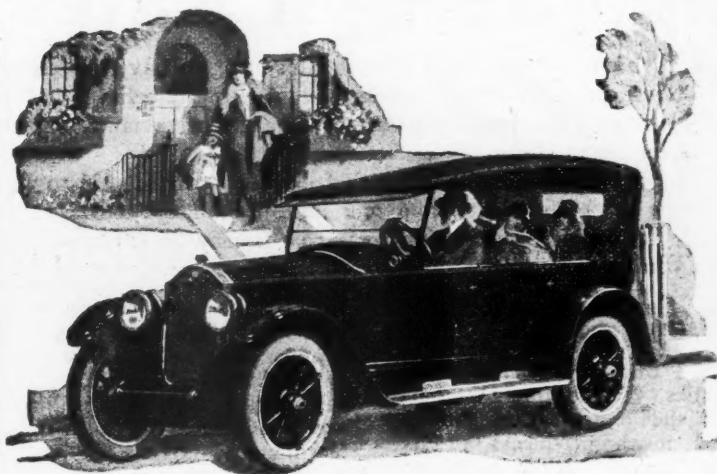
limb make a natural ladder on which one may stand while gathering fruit; all parts of even large trees may be reached if the bracing was done when the trees were small.

Sheep in the Orchard

by Agnes Hilco

SHEEP will be of great service in orchards where cultivation is not the rule. They will keep the vegetation grazed close and will prevent its taking up an excess of plant food, and at the same time they will leave a large part of the plant food in the soil from their droppings. Even where the orchard is cultivated and a cover crop is sown in midsummer, the sheep may be turned in to graze the cover crop to advantage. We have used buckwheat, and stock will enjoy eating it, so sheep would also, but I think some purely forage crop would be better. Even rape could be used if enough sheep were pastured there to keep it down pretty well, and it would make use of the plant food made available so rapidly in late summer and change it into wool and mutton, and the large number the rape would feed would leave more fertilizer on the soil. Fall and winter rains would carry away most of this available food if not used.

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Live Stock Prices and Freight Rates

MUCH is being said about freight rates being a heavy burden to the farmer. Many persons say, and apparently believe, that if freight rates were lower the farmer would receive much higher prices for his products.

Do you really know how much freight actually is paid to the railways on your products from your farm to the large central markets? It would be interesting to learn. It may be much smaller than you believe.

Some Facts About Live Stock

The Bureau of Railway Economics, Washington, D. C., has published information showing how much producers of live stock received for it recently at shipping stations in 27 states; how much the freight charges upon it were to large central markets; and how much were the other costs of distribution.

This study is based upon the 452 carloads of cattle and calves, 267 carloads of hogs and 115 carloads of sheep which arrived at the markets of Chicago, East St. Louis, South Omaha and Kansas City on October 15, November 5, and November 26, 1923. The shipments included 13,161 head of cattle and calves, 19,585 hogs and 20,682 sheep.

Producers Receive 90.2 Per Cent

The total amount paid by the purchasers at the central markets for this live stock was \$1,155,823. Of this amount, \$1,052,263, or 90.2 per cent was received by the producers.

Only \$75,080, or 6.5 per cent of the total amount paid for the live stock at the central markets, was paid the railways. Other costs of distribution amounted to \$48,479 or 3.3 per cent.

The average price per hundred pounds paid for cattle and calves at the central markets was \$6.07. The seller at the local shipping point received on the average \$5.46, or 90 per cent, of this. The railways received an average of 42 cents per hundred pounds for transporting the cattle and calves, or 6.9 per cent of the average price paid at the central markets. Other costs of distribution were 19 cents per hundred pounds, or 3.1 per cent of the purchase price.

The average price paid for

hogs at the large central markets was \$6.90 per hundred pounds. The seller at the shipping point received \$6.32, or 91.6 per cent, of this. The railways received an average of 35 cents per hundred pounds for transporting the hogs, or 5.1 per cent of the average price paid at the central markets. Other distributing costs amounted to 23 cents per hundred pounds, or 3.3 per cent of the average price paid at the large markets.

The average price per hundred pounds paid at the large markets for sheep was \$10.92. The producer or seller at the shipping point received an average of \$9.66 or 88.5 per cent, of this. The railways received an average of 81 cents per hundred pounds for transporting the sheep, or 7.4 per cent of the price paid at the large markets. Other costs of distribution averaged 43 cents per hundred pounds, or 4.1 per cent of the price paid at the central markets.

These facts show that within short periods the prices of live stock fluctuate much more than the total freight charges.

Service Much More Important Than Rates

The live stock shipper may gain much more by being able to get cars promptly, when market prices are favorable than the total amount of the freight charges on them.

Whether the railways can provide freight cars when needed depends upon whether they are allowed to charge rates that enable them to make reasonable profits. Freight business is constantly growing. To meet its increasing demands the railways must be able to add to their equipment and make improvements. They must sell securities to raise the capital. They cannot get investors to buy bonds and stocks unless they can pay interest and satisfactory dividends.

The railways of western territory are not earning enough now to attract capital. The Interstate Commerce Commission has held they may earn 5 1/4 per cent upon their valuation. They actually earned only 3.54 per cent in 1921; 4.03 in 1922 and 4.57 in 1923.

Farmers and live stock producers should use their influence in favor of fair treatment of the railways. To do so means getting better service when needed.

WESTERN RAILWAYS' COMMITTEE ON PUBLIC RELATIONS

650 Transportation Building, Chicago, Illinois

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L. W. BALDWIN, President,
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Missouri-Kansas-Texas Lines.

The Savior of an Industry

(Continued from page 10.)

toward starting anything. It's a great thing to work together. One day two of the leading growers of the district met accidentally, and in the course of the conversation decided that they must start something going. Next day they hired a taxi and canvassed the district to see how many growers were interested and how much stock could be sold tentatively. The results were both good and bad, for although sufficient stock was sold to make it appear that the project might be pushed to completion, still interest was by no means unanimous. The first man approached, the leading grower of the district and an aggressive business man, replied thus: 'You boys canvass the district and I'll head the list with \$10,000.' Other growers doubted the financial success of the venture and some did not subscribe because they had no money to invest. One or two were frank enough to say that the farmers could not run such an organization with success. After a canvass of the growers and business men of the town, the volunteers turned their work over to a representative body of citizens for organization.

'With success already in sight, a meeting was called of all those interested in the venture. An executive committee was named and the work of organization began. Constitution, by-laws and articles of incorporation were soon drawn up. The Marionville Cold Storage Co. was incorporated on February 14, 1916, for a period of 50 years, with a capital stock of \$35,000 fully paid. Par value of the share was placed at \$100 each, and there were 49 original stockholders. After a study of the situation, a friendly and loyal local financier loaned the company

worth its cost, as it is a dependable supply of water that has supplied the whole city during an emergency at the city wells. During the seven years since its completion, the plant has caused the very minimum amount of trouble. Credit must be given the architect and builder, and the plant will stand for generations as a monument to their ability.

Organization and Management

'The organization and management of the plant is relatively simple. The stockholders elect a board of seven directors for periods of three years. The board perfects its own organization by the election of the regular officers who are responsible for the management of the plant. The board selected Fred D. Hawley to fill the position of engineer-manager of the plant, and he has proven almost indispensable to its success. It soon became evident that the clerical work of the company would be too much to saddle on to any member of the board, and since Fred had proven his worth in many ways, he was offered stock in the company, elected to the board of directors, and made secretary of the board. His never-failing kindness and courtesy, and his willing activity are not wasted on either buyer or grower; they respect Fred, who is never too busy to answer queries concerning the plant or the fruit industry. During the closed season, the employees number two in addition to Fred: A night engineer-watchman and a day man with the same job. During the rush season, the force varies from two up to 18 men, according to the rush of business. The cost of maintenance is variable, ranging from \$10,000 to \$12,000 per year. The variation is due to two factors: The length of time refrigeration is carried on, and the force neces-



Barrels of apples stored by fruit growers in their own cold storage plant, Marionville Cold Storage Co.

\$20,000, and the contracts for the erection of the plant were awarded on March 21, 1916. Its erection was rapid, and the 40,000 barrel capacity plant was completed in time for the fall apple crop, at a cost of approximately \$55,000.

Construction of Plant

'The plant is excellently constructed, having an exterior layer of 12 inches of brick, eight inches of hollow tile, four inches of insulating cork and finished with three-fourths inch cement plaster. It covers a ground space 84 by 112 feet and has a basement story of 10 feet and a second and third story of 14 feet each. The refrigerating system is by direct expansion of ammonia, and the refrigerating machinery consists of three units, each with a refrigerating capacity of 15 tons. For five years after the completion of the plant, the city water supply was depended upon to supply water for refrigeration purposes, but when this became too great a source of annoyance, the company put in a deep well of their own. This well, 1000 feet in depth, with pump and pumphouse completed, was built in 1921 at a cost of \$6500, and has proven far more than

sary to handle the stock. Precooling strawberries and peaches, and opening the plant for August apples, made the 1922 costs higher. If the weather forces quick harvesting of the crop, the jam at the plant makes the addition of more men necessary to handle the crop efficiently. The usual season of the plant is from about September 5 to May 1, with an extra week or more for the precooling season on other fruits.

'Since the plant is co-operative, it is necessary to stress the fact that the storage rates are as cheap as the majority of the commercial apple storages of the country. The rules and regulations enforced in the plant are comparatively the same as those in force in other storages, although in some instances they are far more liberal. Persons interested in obtaining information along the line of rates and regulations will do well to write to the secretary. Space is allotted very methodically. At an early date in July the secretary of the board makes it known that he will receive orders for space from stockholders between two certain dates, and that after those

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dates he will receive orders from non-stockholders. Space is then allotted in the order in which the requests are made. The company holds the key, in that no transfers can be made without the consent of the management. All space contracts are ironclad and unbreakable. This system of management has proven efficient and economical, giving excellent service.

"As to the financial side of the question, suffice it to say that notwithstanding two exceedingly lean years and the inexperience of the management, in exactly seven years the whole of the original debt has been paid off; the expensive well and its equipment has been placed in operation; the whole plant has been equipped with



Building of Marionville Cold Storage Co. Capacity, 40,000 barrels. Financed, maintained and operated by fruit growers.

those labor saving devices that are necessary to economical handling of the fruit; a real estate purchase has been made with an eye toward future needs; and last but not least, there is still a bank account to the credit of the company. The original 49 stockholders have decreased to 37 for various reasons, but the stock that sold for \$100 par has reached \$200, with none being offered for sale.

"When the apple crop in the Marionville district was a total failure in 1921, that did not necessarily mean that the expense of maintenance of the plant went on without income. Rather than allow the plant to remain shut down for a year, the board of directors sent its president to a southern market to interview wholesale dealers there. As a result, 37 carloads of apples from Oregon and Washington were received at the Marionville plant with 'storage in transit' privileges, to be sent on to the southern market later in the season. Thus the plant was kept running without loss to the stockholders, and with the privilege of rendering a good service to fellow horticulturists. Needless to say, the reputation of the plant was enhanced by this service.

"It is hard to measure concretely the success of the plant as seen by the fruit grower, other than to say that it has long ago earned its right to the title given it, 'The Savior of an Industry.' Whereas, in 1916, the plantings in the district were steadily decreasing, now, in 1924, the region has a total of 1200 acres of bearing orchard, with 1400 acres of non-bearing orchards, running mostly to the higher quality apples which are more easily handled since the erection of the plant. Most of the orchards in the district are almost within sight of the plant. The apples are picked from the trees and are rushed into storage within from 30 minutes to four hours. The growers have a personal pride in the plant, they feel it is their own. They keep in close touch with their fruit and are enabled to sell it when it has reached its optimum condition. They meet the buyers face to face and make lasting friendships where before they had only dark suspicions and distrust."

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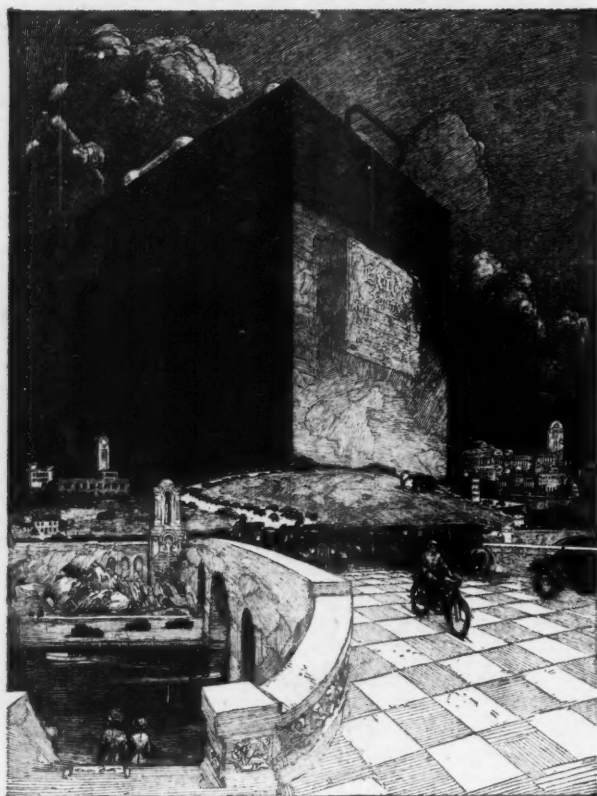
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BATTERIES

Cherry Trees Thrive in Sod

by Robert Sparks Walker

THERE is an interesting old farm house that still stands on the site of the Lookout Mountain Battlefield. It was built by a man by the name of Cravens, in the year 1835, and is known as the Cravens' House. It is situated half way up the east side of Lookout Mountain, and was the headquarters of General U. S. Grant during the military maneuvers about Chattanooga, during the Civil War.

Evidently Cravens was very fond of cherries, for he set out a number of trees in the year 1852, among them being a few Blackhearts. The land is sandy, semi-fertile and well drained. If General Grant and staff had sojourned on the Cravens premises in the spring of 1863 instead of the autumn, they could have eaten ripe cherries, for the trees were then 11 years old. Although the trees are now 72 years old, they are still healthy and very fruitful, and look like they are good for a century or more yet. The trees have grown so large that a part of the cherry orchard has developed into a cherry forest. Think of a cherry tree about 90 feet high, with a diameter at the base of the trunk of three and one-half feet! Yet that is what



This cherry tree is 72 years old, grows in the sod and is ever productive.

the largest cherry tree measures. It seems to be about as large as any of the forest trees in the neighborhood, and to take a look at the large cherry forest makes one feel that he is dreaming, or else looking at a tree that is as magical as Jack's wonderful beanstalk. But the age and the bigness of the trees do not seem to interfere with their ability to produce abundant crops. However, it must be a disagreeable task to harvest the fruit, in fact, the birds no doubt carry away a great deal of the fruit without being scolded by the owner.

So much for the wonderful age and size of these cherry trees. The most interesting thing about them is the long life and their fruitfulness. Some growers do not succeed with cherry trees simply because they cultivate the trees like they do apple and peach trees. The fact is, a cherry tree has a wild disposition and succeeds best when cultivation is withheld from them, especially after the first two or three years. I doubt very much that the soil about these huge cherry trees has been stirred in the last 50 years, but the grass has been kept cut. It has been both my experience and observation that cherry trees, when cultivated, do not grow into the strong, healthy trees that they do when left in the sod. Twelve years ago I selected cherry trees for a young orchardist. At the time he put out his orchard,

he set a few trees on the lawn about his home. The trees that he set in the orchard which he cultivated like a crop of corn have been dead long ago, but the ones that were set on his lawn are large and productive. Those growing on the lawn have never had the ground stirred about them, and they are sure-croppers. However, the cherry tree must be set in a well-drained soil, for it cannot stand wet or damp feet.

Co-operative Contracts Must State Deductions to Be Made

A COURT decision has recently been rendered in California which will be interesting to existing co-operatives, and to those planning new organizations, as it indicates an important provision which should be made in all contracts.

In the case of *Silveira vs. The Associated Milk Producers* (219 Pac. 461) the District Court of Appeals ruled that the association could only make deductions specifically provided for in the contract.

The contract of the association provided that the marketing charge "shall in no case exceed 15 cents per hundred pounds." Notwithstanding this provision, the association deducted additional amounts with which to build a milk plant and for the purpose of purchasing an interest in a dairy company which it was proposed to use as a marketing agency.

The court held that the association could not make deductions in excess of 15 cents per hundred pounds and a decision was therefore rendered for the plaintiff. It was brought out in the proceedings that the by-laws did not conflict with the contract.

This decision shows that contracts should be made very clear in regard to the charges which are to be deducted. It will usually be a good precaution to enumerate all the charges which the association may ever desire to make, and, in addition, to add words something like the following: "And any other charges or deductions which in the opinion of the directors shall be for the interest of the association and its members."—Abstract from *Agricultural Co-operation*.

Fruit-Tree Leaf-Roller in New York Orchards

A NEW insect pest of apples in New York orchards is attracting the attention of the entomologists at the Experiment Station at Geneva. This is the fruit-tree leaf-roller, an insect that is said to have caused considerable trouble from time to time in western fruit plantings. Recently serious outbreaks have occurred in Wayne, Ontario, Genesee, Orleans, Chautauqua, Rockland, Dutchess, Wyoming, Monroe, Ulster, Oswego and Columbia counties. Fruit growers are urged by the Station specialists to be on the lookout for the insect and to take immediate steps to combat it.

It is reported that as high as 40 per cent of the fruit on a tree may be injured so that it drops prematurely, while frequently as much as 30 per cent of that which remains is so deformed by the feeding of the insects that it is unmarketable. Occasionally, an entire crop may be lost.

Spraying is effective only against the eggs or the young caterpillars. Miscible oil sprays have been used against the eggs to good advantage in other states, say the Station entomologists, but in New York the results have not been so satisfactory, although this spray has aided in checking the pest. The use of a poison spray containing four pounds of lead arsenate in 100 gallons of water, applied at the so-called pre-pink stage of the blossom development, has given good results in protecting fruit and foliage from attacks of the leaf-roller.

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